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# Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION



FOREIGN BROADCAST INFORMATION SERVICE

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15 March 1984

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NUCLEAR DEVELOPMENT AND PROLIFERATION**

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AUSTRALIA

ANTINUCLEAR ACTIVISTS TO CAMPAIGN AGAINST ALP AT POLLS

Melbourne THE AGE in English 9 Feb 84 p 4

[Article by Barbara Hutton]

[Text]

Anti-nuclear activists planning to campaign against ALP candidates who support uranium mining in the run-up to the Federal election.

The strategy is based on the 1983 south-west Tasmanian dams campaign, when a coalition of environment groups campaigned for the ALP and Australian Democrats in marginal seats.

A spokesman for Friends of the Earth in Victoria, Ms Pat Jessen, said yesterday that unless the ALP strengthened its anti-uranium policy at its national conference in July, the campaign would go ahead.

She said the anti-nuclear movement would campaign in support of ALP candidates who had shown "by their actions" that they opposed uranium mining, and against those who supported mining.

The plan was launched at a national meeting of Friends of the Earth on Monday. It decided to campaign against Labor candidates only in seats where an Australian Democrat or anti-nuclear independent was standing. POE will approach the Coalition for a Nuclear-Free Australia and other groups for help in the campaign.

Ms Jessen said it would not be a blanket campaign against the Labor party. "The party stood at the last election on a policy of phasing out uranium mining. If election promises are broken the environment movement has no choice but to look for candidates who will follow through."

She said the Green Party in West Germany had pressured the Social Democrats into strengthening their environmental policies. "We want the Government to recognise the strength of feeling within their own electorate on this issue before it is too late."

A West Australian delegate, Dr Peter Brotherton, said at the meeting that State surveys showed 25 per cent of voters strongly opposed uranium mining compared to 5 per cent strongly in favor. "Only people who feel strongly about the issue will vote on it," he said.

A Wilderness Society organiser, Mr Chris Harris, said yesterday that his group had campaigned in support of the ALP in 15 marginal seats around Australia. All were won by Labor.

"Our campaigning was the decisive factor in three of those seats, including Fadden in Queensland, Diamond Valley in Victoria and Eden Monaro in New South Wales," he said. "We probably influenced the outcome in 12 other seats. About 15 per cent of ALP voters followed our ticket."

"However, we had 8000 people handing out leaflets on the day, and it was an issue that threatened very few people. I wish them luck. The uranium issue will be a hard one."

The Victorian ALP secretary, Mr Peter Batchelor, said yesterday: "The party's position will be determined at the next national conference in Canberra."

Most ALP backbenchers in marginal seats are not conference delegates and will not determine party policy.

CSO: 5100/4359

AUSTRALIA

BRIEFS

NUCLEAR MATERIAL PROTECTION PACT--Australia will today sign an international agreement on the protection of nuclear material. The agreement will be signed in Vienna by the Australian ambassador to Australia, Mr Duncan Campbell, who is also Australia's representative to the International Atomic Energy Agency. The convention provides for standards for the adequate protection of nuclear material during international transport. It also provided for international cooperation in recovering any nuclear material which may be stolen. The minister for foreign affairs, Mr Hayden, says Australia's signature shows that the government is committed to supporting international measures to safeguard nuclear material. [Text] [Melbourne Overseas Service in English 0830 GMT 22 Feb 84 BK]

CSO: 5100/4358

PEOPLE'S REPUBLIC OF CHINA

FRENCH NUCLEAR PLANT COOPERATION PLANS OPTIMISTIC

OW291826 Hong Kong AFP in English 1601 GMT 29 Feb 84

[Text] Beijing, Feb 29 (AFP) -- The managing director of the French firm Alsthom Atlantique said his company was "moderately" optimistic about prospects for nuclear cooperation with China.

J.P. Desgeorges, who arrived here Monday, told French journalists that his talks with top Chinese officials yesterday and today focused on prospects for supplying China with two nuclear reactors of 900 megawatts each. The reactors would equip a power plant which might be built in eastern China, probably in Shanghai, he added.

Mr Desgeorges, who had several rounds of talks with Vice Premier Li Peng and Machine Building Minister Zhou Jiannian, said Alsthom had several cards to win the contract. He also pointed to the current good relations between France and China as well as to the memorandum signed last May between the two countries when French President Francois Mitterrand visited China. "The die is not cast. But we can be moderately optimistic," he said, adding that it was now up to Chinese leaders to decide.

The Sino-French memorandum provides for cooperation in two projects, including construction of a power station in the southern province of Guangdong. The French firm Framatome is expected to provide two 900-megawatt pressurized water reactors for the plant, to be built at Daya Bay about 70 kilometers (about 44 miles) northeast of Hong Kong at an estimated cost of four to five billion U.S. dollars. Britain is to supply the turbine generators.

In this connection, the English-language CHINA DAILY today reported that an agreement on creation of a joint venture between a Chinese company and a Hong Kong firm was "near." The Bank of China is to extend 90 percent of the capital to the joint venture company which will have to provide the remaining 10 percent, the paper added, without further details on the financial cost of the project.

Meanwhile, Mr Desgeorges said railway cooperation also came up during his talks. The Chinese side spoke of possible plans to build a 1000-kilometer (600 miles) railway line to ferry coal from Datong in the northern province of Shanxi to the port of Qinhuangdao in Hebei Province, which surrounds Beijing. To carry out this project, the Chinese would ask foreign firms to supply the infrastructure, signalling equipment and the rolling stock, he indicated.

Mr Desgeorges and his delegation are to leave here tomorrow for Shanghai where they are to spend two days before heading for Hong Kong.

CSO: 5100/4113

PEOPLE'S REPUBLIC OF CHINA

GUANGDONG ACHIEVEMENTS IN NUCLEAR TECHNOLOGY

HK220421 Guangzhou Guangdong Provincial Service in Cantonese 1130 GMT 20 Feb 84

[Text] Gratifying achievements have been attained in the application of atomic nuclear science and technology in our province. At present, more than 100 units are applying nuclear technology. They have attained some important results in various fields, such as radioactive breeding, radioactive preservation of freshness, radioactive elimination of insects through sterilization, and isotope treatment. Ten of these items have been given important scientific research awards at national and provincial science conferences.

Since the late 1950's, our province has been doing research work on the application of nuclear science and technology. In recent years, relatively great achievements have been attained. This is manifested primarily in radioactive breeding. We have succeeded in breeding a number of fine varieties through radioactive treatment. For example, the provincial institute of agricultural science has succeeded in breeding several varieties of peanuts, such as (Yueyou) 22, 33, 551, and 116 breeds of peanuts with notable production results. More than 140,000 dan of peanuts have been produced from 5,000 mu of land. These varieties have become the principal fine varieties of peanuts in our province. The utilization of radioactivity in fruit, vegetables, food, and destructive insects can also attain various results, such as preserving freshness, preventing putridity, and preventing and eliminating destructive insects through sterilization.

At present, more than 40 units in 14 localities of our province are making diagnoses by utilizing nuclear medical science. They can scan or determine the function of various internal organs, such as the heart, blood vessels, liver, brain, lungs, kidneys, thyroid gland, and bones, apply nuclear radioactive treatment in some diseases, extensively apply radioactive analyzing technologies, and examine more than 20 items. Meanwhile, some major cities, prefectures, and counties in the province have also used radioactive treatment, such as Cobalt 60, thus providing advanced technological means for the treatment of cancer. Moreover, more than 20 units have also attained certain achievements in the application of nuclear technology in basic and clinical scientific research.

CSO: 5100/4111

PEOPLE'S REPUBLIC OF CHINA

GUANGDONG OPENS NUCLEAR TECHNOLOGY EXHIBITION

HK220431 Guangzhou Guangdong Provincial Service in Cantonese 1130 GMT 20 Feb 84

[Text] An exhibition on the application of atomic nuclear science and technology, jointly sponsored by the Guangdong Provincial Scientific and Technological Commission and the Guangzhou City Scientific and Technological Commission, opened in the second room of the Guangzhou Scientific and Technological Exchange Hall this afternoon. More than 500 people, including the responsible comrades of the State National Defense Industry Commission, Ministry of Nuclear Industry, Ministry of Water Conservancy and Power, Nuclear Society, and party, government, and Army in the Guangzhou area; responsible persons of scientific research, production, and medical units and institutes of higher learning; and the experts, scientists, and technicians concerned, attended the opening ceremony. Yang Li, vice governor of Guangdong Province, and (Chen Ruyi), vice mayor of Guangzhou City, cut the ribbon at the opening of the exhibition.

The present exhibition is being held on the basis of the national exhibition on the application of atomic nuclear science and technology and with the aim of popularizing nuclear scientific and technological knowledge and spreading the achievements in the application of nuclear science and technology.

CSO: 5100/4111

PEOPLE'S REPUBLIC OF CHINA

PRC OFFICIAL AT LONDON NUCLEAR WASTE MEETING

OW252222 Beijing XINHUA in English 1838 GMT 25 Feb 84

[Text] London, February 24 (XINHUA) -- Thirty-six nuclear and non-nuclear countries agreed here today to ban dumping of highly radioactive waste at sea until a research to be conducted proves it "technically feasible and environmentally acceptable." The agreement was reached at the five-day eighth consultative meeting of the International Maritime Organization's London dumping convention, which ended here this evening.

The convention's chairman, Geoffrey Holland of Canada, said that the delegates agreed that a voluntary ban on dumping of low-level nuclear waste proposed by Spain and passed last February will remain in effect through September 1985 until it is proved safe for marine life. During heated discussions at the meeting, however, delegates from more than 20 countries expressed support for land storage rather than sea disposal.

China attended the meeting for the first time as an observer to have a better understanding of the convention which was set up in 1972 to regulate sea dumping of nuclear waste in the world. Speaking at the meeting, Chinese representative Wu Jun said China is interested in the convention and is in the process of initiating study of it.

CSO: S100/4112

PEOPLE'S REPUBLIC OF CHINA

AGREEMENT NEAR ON PRC NUCLEAR POWER DEAL

OW271153 Tokyo KYODO in English 1135 GMT 27 Feb 84

[Text] Tokyo, Feb 27 KYODO--Japan and China will seek to reach agreement on a nuclear power equipment deal in Tokyo Wednesday, one day later than scheduled, government sources said Monday. The delay has been necessitated by differences over working with respect to Tokyo's nonproliferation policy and safeguard methods for nuclear power equipment to be exported, the sources said. The two countries discussed an outline and other broad aspects of a proposed Sino-Japanese atomic energy cooperation agreement on the first day of talks held in Tokyo Monday. They were originally scheduled to negotiate details of the nuclear power equipment deal Tuesday.

CSO: 5100/4112

POLAND

ARTIFICIAL RADIOACTIVITY FIELD IN SOUTHERN BALTIC DESCRIBED

Lodz PRZEGLAD GEOFIZYCZNY in Polish No 1, Jan-Mar 83 pp 65-78

[Excerpt] The paper presents the results of analysis of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  in Baltic water obtained in 1980 and compared to data from 1975-1979. Some factors influencing concentration field of radiostrontium and radio-caesium are also discussed.

It was estimated that  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  are evenly distributed in open Baltic Sea and non-evenly distributed in shore and western parts of the sea. The main factors influencing distribution of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  in surface water are atmospheric precipitation and river input into the sea. Quantitative relations between these radionuclides are mainly influenced by water inflow from the North Sea in which concentration of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  of Baltic water is due to waste of applying of nuclear energy by the North Sea states.

Table 1. Concentrations of  $^{90}\text{Sr}$  i  $^{137}\text{Cs}$  in seawater samples collected in 1980

| Stacja<br>Station | Współrzędne<br>Coordinates |                    | Data pobrania<br>Date of<br>collection | Głębokość<br>Depth<br>[m] | Zasolenie<br>Salinity<br>[%] | Aktywność [mBq/l. $\pm$ 1σ]<br>Activity | $^{137}\text{Cs}$ |                   |
|-------------------|----------------------------|--------------------|--|---------------------------|------------------------------|---|-------------------|-------------------|
|                   | $^{\circ}\text{N}$         | $^{\circ}\text{E}$ |  |                           |                              |   | $^{90}\text{Sr}$  | $^{137}\text{Cs}$ |
| P13               | 55°02'.5'                  | 16°18'             | 10 VI 80                               | 0                         | 7.99                         | 15.2 $\pm$ 0.4                          | 11.1 $\pm$ 0.4    | 0.8               |
| P39               | 54°44'.5'                  | 15°08'             | 11 VI 80                               | 0                         | 8.03                         | 18.9 $\pm$ 0.8                          | 17.4 $\pm$ 0.8    | 0.9               |
| B12               | 54°19'.5'                  | 14°25.1'           | -                                      | 0                         | 7.96                         | 22.2 $\pm$ 0.4                          | 18.9 $\pm$ 0.4    | 0.8               |
| B13               | 54°04'                     | 14°15'             | -                                      | 0                         | 6.13                         | 15.9 $\pm$ 0.4                          | 12.6 $\pm$ 0.4    | 0.8               |
| P5                | 55°15'                     | 15°59'             | 13 VI 80                               | 0                         | 8.03                         | 18.1 $\pm$ 0.4                          | 16.6 $\pm$ 0.4    | 0.9               |
| P40               | 55°38'                     | 18°36'             | 15 VI 80                               | 0                         | 7.90                         | 16.6 $\pm$ 0.4                          | 12.6 $\pm$ 0.4    | 0.8               |
| P1                | 54°50'                     | 19°20'             | 17 VI 80                               | 0                         | 7.34                         | 14.8 $\pm$ 0.4                          | 13.0 $\pm$ 0.4    | 0.9               |
| P116              | 54°39.1'                   | 19°17.6'           | -                                      | 0                         | 7.29                         | 17.8 $\pm$ 0.8                          | 13.7 $\pm$ 0.8    | 0.8               |
| P110              | 54°30'                     | 19°06.8'           | -                                      | 0                         | 7.52                         | 19.2 $\pm$ 0.4                          | 14.4 $\pm$ 0.4    | 0.8               |
| P40               | 55°38'                     | 18°36'             | 20 IX 80                               | 0                         | 7.82                         | 17.2 $\pm$ 0.9                          | 16.1 $\pm$ 0.8    | 0.9               |
| P5                | 55°15'                     | 15°59'             | 21 IX 80                               | 0                         | 7.96                         | 16.5 $\pm$ 1.1                          | 16.0 $\pm$ 1.2    | 1.0               |
| P39               | 54°44.5'                   | 15°08'             | 22 IX 80                               | 0                         | 7.98                         | 16.7 $\pm$ 1.0                          | 15.8 $\pm$ 1.1    | 1.0               |
| P39               | -                          | -                  | -                                      | 61                        | 13.53                        | 17.4 $\pm$ 1.5                          | 27.8 $\pm$ 1.8    | 1.6               |
| B12               | 54°19.5'                   | 14°25.1'           | 23 IX 80                               | 0                         | 8.17                         | 15.6 $\pm$ 1.4                          | 16.2 $\pm$ 1.1    | 1.0               |
| B13               | 54°04'                     | 14°15'             | -                                      | 0                         | 6.48                         | 19.3 $\pm$ 1.7                          | 19.1 $\pm$ 1.4    | 1.0               |
| P1                | 54°50'                     | 19°20'             | 26 IX 80                               | 0                         | 7.79                         | 17.7 $\pm$ 0.9                          | 23.2 $\pm$ 0.9    | 1.3               |
| P1                | -                          | -                  | -                                      | 103                       | 12.75                        | 15.3 $\pm$ 0.8                          | 17.8 $\pm$ 1.0    | 1.2               |
| P110              | 54°30'                     | 19°06.8'           | 27 IX 80                               | 0                         | 7.63                         | 18.6 $\pm$ 1.4                          | 15.8 $\pm$ 0.9    | 0.8               |
| ZN2               | 54°23'                     | 18°57.5'           | -                                      | 0                         | 6.36                         | 21.9 $\pm$ 2.1                          | 6.6 $\pm$ 0.5     | 0.3               |
| ZN2               | -                          | -                  | -                                      | 12                        | 7.33                         | 25.8 $\pm$ 1.9                          | 17.8 $\pm$ 0.3    | 0.7               |

Table 2. Concentrations of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  in the Vistula water in 1980

| Month | Aktywność [ $\text{mBq/l} \pm 1\sigma$ ] |                   | $\frac{^{137}\text{Cs}}{^{90}\text{Sr}}$ |
|-------|--|-------------------|--|
|       | $^{90}\text{Sr}$                         | $^{137}\text{Cs}$ |  |
| II    | $8.9 \pm 0.4$                            | $0.7 \pm 0.1$     | 0.09                                     |
| III   | $9.6 \pm 0.4$                            | $0.7 \pm 0.1$     | 0.09                                     |
| IV    | $11.8 \pm 0.4$                           | $0.7 \pm 0.1$     | 0.08                                     |
| V     | $12.9 \pm 0.4$                           | $0.4 \pm 0.1$     | 0.03                                     |
| VI    | $11.5 \pm 0.4$                           | $0.4 \pm 0.1$     | 0.03                                     |
| VII   | $15.9 \pm 0.4$                           | $0.4 \pm 0.1$     | 0.02                                     |
| VIII  | $19.6 \pm 0.4$                           | $0.3 \pm 0.1$     | 0.02                                     |
| IX    | $12.2 \pm 0.4$                           | $0.5 \pm 0.1$     | 0.04                                     |
| X     | $8.5 \pm 0.4$                            | $1.5 \pm 0.1$     | 0.17                                     |
| XI    | $14.6 \pm 0.5$                           | $1.1 \pm 0.1$     | 0.08                                     |
| XII   | $11.8 \pm 0.4$                           | $0.7 \pm 0.1$     | 0.06                                     |

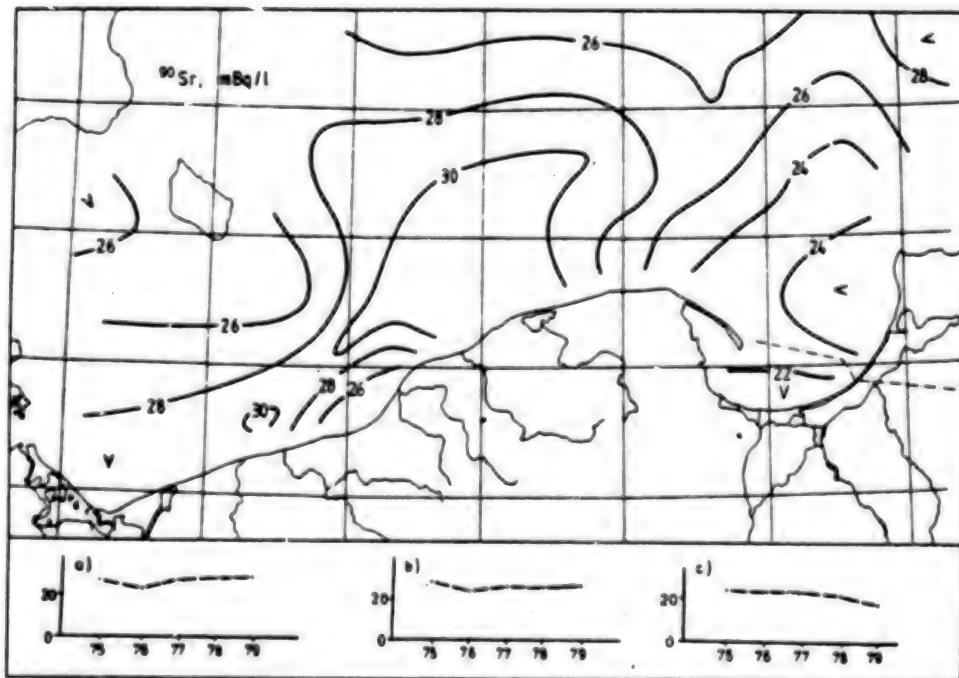
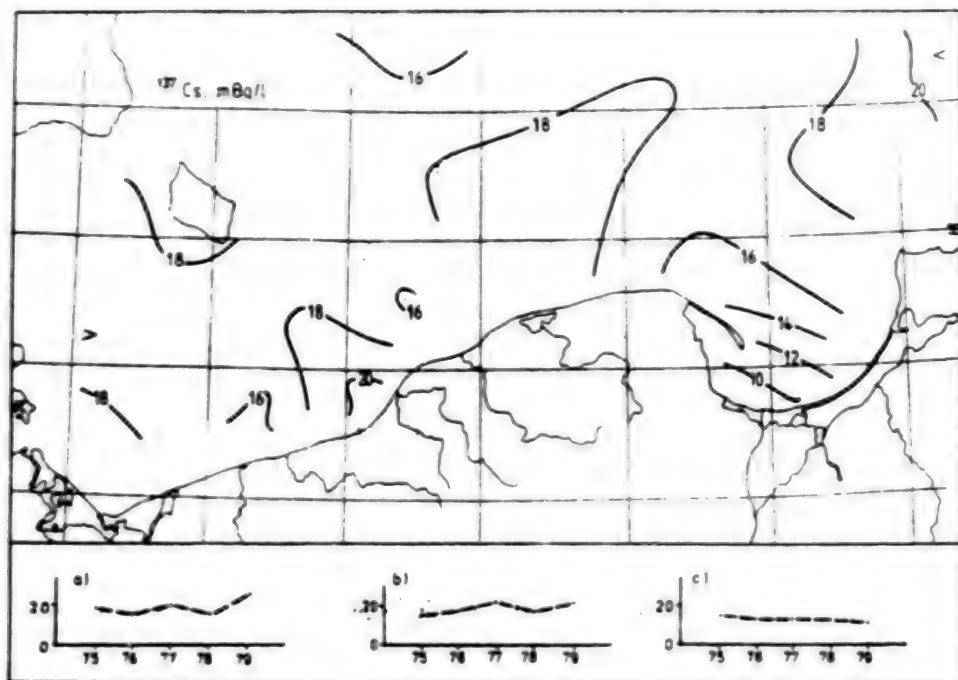
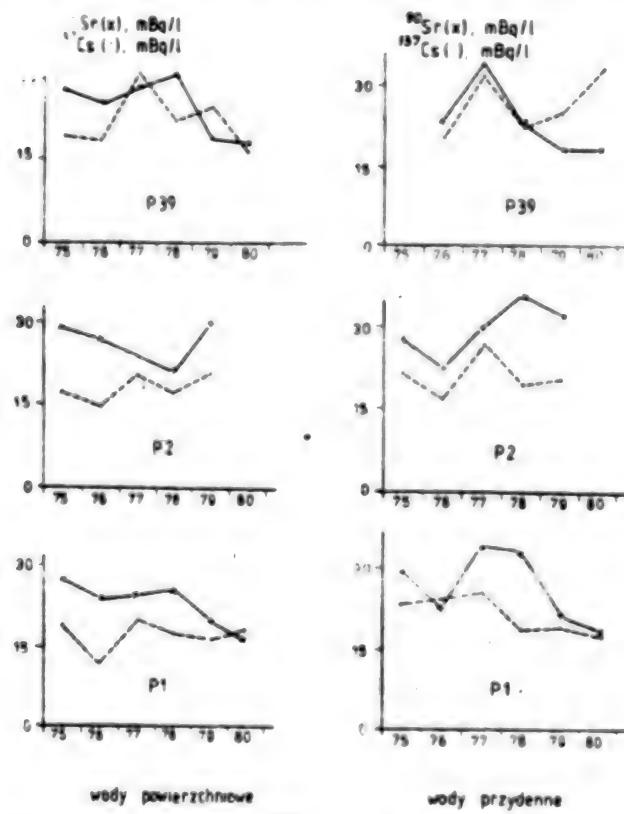


Fig. 1. Surface distribution of  $^{90}\text{Sr}$  in 1975-1979 and multiyear changes of  $^{90}\text{Sr}$  in surface water a) Pomeranian Bay, b) middle part of Southern Baltic, c) Gulf of Gdańsk



**Fig. 2.** Surface distribution of  $^{136}\text{Cs}$  in 1975-1979 and multiyear changes of  $^{137}\text{Cs}$  in surface water a) Pomeranian Bay, b) middle part of Southern Baltic, c) Gulf of Gdańsk



**Fig. 3.** Multiyear changes of  $^{90}\text{Sr}$  (x) and  $^{137}\text{Cs}$  (.) of chosen sampling stations

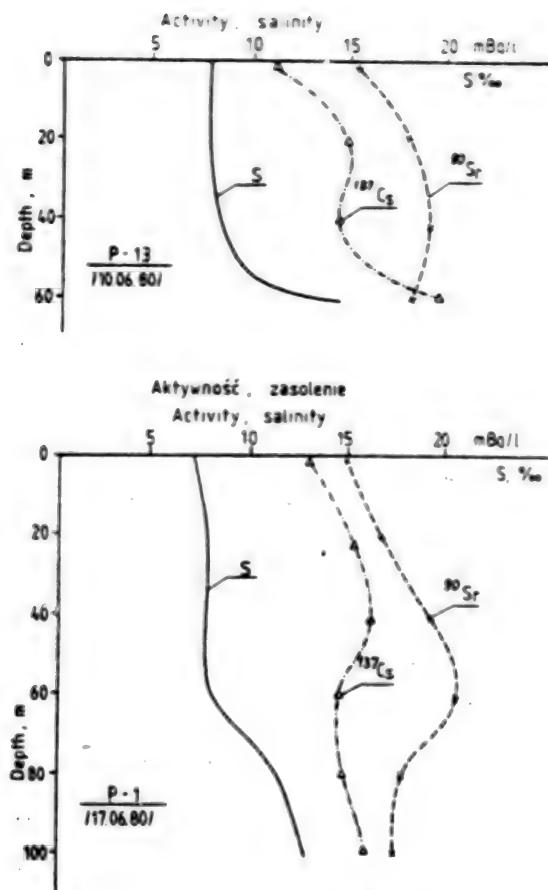


Fig. 4. Vertical distribution of  $^{90}\text{Sr}$  (x) and  $^{137}\text{Cs}$  ( $\Delta$ ) in 1980

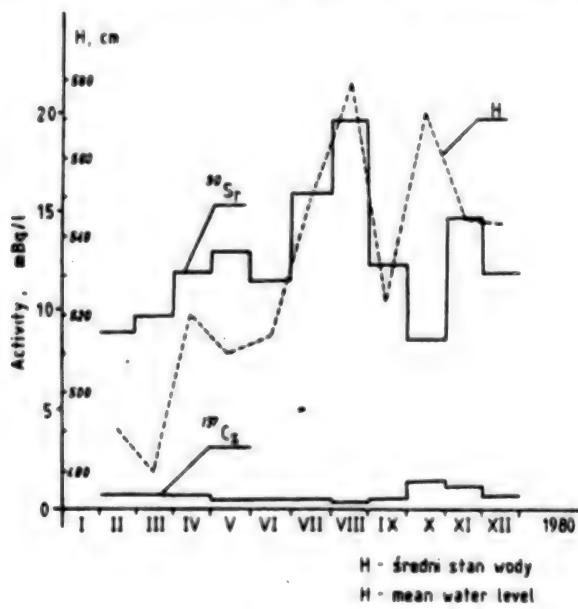


Fig. 5. Concentration of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  in surface Vistula water in 1980

Table 3. Concentrations of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  in the Baltic sediments

| Stacja<br>Station | Współrzędne<br>Coordinates |                   | Data<br>pobrania<br>Date of<br>collection | Rodzaj<br>osadu<br>Sediment<br>type | Aktynołość, Bq/kg<br>suchej masy<br>Activity, Bq/kg dry |                            |
|-------------------|----------------------------|-------------------|---|-------------------------------------|---|----------------------------|
|                   | $\text{N}$                 | $\text{E}$        |   |                                     | $^{90}\text{Sr}, \pm 1\%$                               | $^{137}\text{Cs}, \pm 1\%$ |
| B13               | $54^{\circ}04'$            | $14^{\circ}15'$   | 23 IX 80                                  | piaszek mulisty<br>sandy silt       | 0,13 ± 0,05   | 3,52 ± 0,15                |
| P39               | $54^{\circ}44,5'$          | $15^{\circ}08'$   | 22 IX 80                                  | muł ilaste<br>silt - clay           | 0,50 ± 0,13   | 6,92 ± 0,20                |
| P40               | $55^{\circ}38'$            | $18^{\circ}36'$   | 20 IX 80                                  | muł piaseczny<br>silty - sand       | 0,29 ± 0,10   | 6,59 ± 0,21                |
| P1                | $54^{\circ}50'$            | $19^{\circ}20'$   | 26 IX 80                                  | muł ilaste<br>silt - clay           | 0,74 ± 0,13   | 12,91 ± 1,11               |
| P116              | $54^{\circ}39,1'$          | $19^{\circ}17,6'$ | 17 VI 80                                  | muł<br>mud                          | 0,32 ± 0,30   | 10,43 ± 0,57               |
| P110              | $54^{\circ}30'$            | $19^{\circ}06,8'$ | 17 VI 80                                  | muł ilaste<br>silt - clay           | 1,15 ± 0,28   | 36,26 ± 1,75               |
| ZN2               | $54^{\circ}23'$            | $18^{\circ}57,5'$ | 27 IX 80                                  | muł piaseczny<br>silty sand         | 0,98 ± 0,06   | 31,75 ± 0,47               |

CSO: 5100/3009

ATOMIC ENERGY RESEARCH, DEVELOPMENT, APPLICATION OUTLINED

Warsaw RZECZPOSPOLITA in Polish 4-5 Feb 84 v 4

[Article by Jadwiga Korzeniowska: "Studies and Applications of Atomic Energy"]

[Text] The Polish atomic energy industry has undergone substantial organizational transformation during the last two years. The State Atomic Energy Agency [PAA] was created to encompass all scientific and production activities involved in the development of atomic energy. Changes were completed on Dec 13, 1982, when the Chairman of the Council of Ministers issued an order which converted the former Institute of Nuclear Research into three independent scientific institutions also subordinated to the PAA. It is possible now to look back at one year of activity under the new organizational structure.

In 1983, the units subordinated to the PAA conducted a research, development and application project in the framework of two government programs: the PR-6 "Treatment of Oncological Diseases" and PR-8 "Comprehensive Development of Energy Production," and the modal program (04.3) "Studies of Nuclear Processes and Applications of Nuclear Technology in the Socio-economic Development of the Nation."

Of the major achievements of the PAA's activities in 1983, one should mention completion of the first Polish 10 MeV accelerator for therapeutic accelerators Neptun 10p. This is an original design based on studies by Polish scientists and new technological developments. This development is part of the thrust to reduce imports. With the current exchange rates, buying such a unit from a capitalist country would cost \$35,000. In the long-term plans of the PAA, it is envisaged that by 1985 Poland will attain in the production of accelerators complete independence from imports from dollar markets.

Based on domestic designs, the production has been started of therapeutic tables necessary for application of accelerators in oncological treatment. Production of thermal radiation treatment tubes has been organized, which is an innovative technique for Poland.

In 1983, experimental manufacturing of line electron accelerators for medical applications, LIMEX (medical accelerators of Neptun 10p), and of

radiographic applications has begun; these units will replace the cobalt bombs. A prototype of this equipment will shortly be placed at the disposal of the Warsaw Oncology Center. An advantage of these Polish designs is the fact that 99 percent of subassemblies and technologies are domestic.

Last year, the PAA delivered to Belchatow Electric Power Plant for experimental operation the first computerized system block controller. The output of CAMAC equipment has been expanded mainly to be exported to the Soviet Union under a long-term special contract. Preliminary data show that the total value of product output by enterprises within the PAA framework will be 4.9 billion zlotys in 1984, with the sales of research and development approaching 1.5 billion zlotys.

The growth of Polish atomic industry, both domestic and for export, in 1983 is estimated at 15 percent, suggesting adequacy of introduced organizational innovations, although it is too early to draw final conclusions.

9922  
CSO: 5100/3008

YUGOSLAVIA

FINNISH FIRM TO AID IN NUCLEAR PLANT CONSTRUCTION

Helsinki HELSINGIN SANOMAT in Finnish 13 Feb 84 p 22

/Unsigned article: "IVO Prepares Proposal for Yugoslav Nuclear Power Plants"/

/Text/ Finland's nuclear power industry hopes to land a share in the construction contract for six nuclear power plants in Yugoslavia. Imatran Voima and the Soviet Atomenergoexport have been preparing their proposals for two years now.

By next summer Yugoslavia is expected to submit the proposal requests for the construction of the 1,000-megawatt plant in Trevlaka near Zagreb. The Trevlaka proposal competition is the key to participation in the entire nuclear power program, because all six plants to be constructed are exactly the same.

According to Yugoslav sources the intention is to begin construction work on the first power plant in 1987. In accordance with the decision of the country's federal government the goal is to complete the construction of the entire series of six nuclear power plants by the year 2000, it is reported in a recent economic survey of the news agency Tanjug.

Finnish firms are extremely interested in getting in on the project, according to deputy managing director Kari Huopalahti of the Imatran Voima IVO Consulting Company.

In practice collaboration between IVO and Atomenergoexport would open up the possibility for this. On the basis of this collaboration the participation of Finns in Yugoslavia's nuclear power program has been prepared for a couple of years.

Finns already have a foot in the door, because in the space of a month two consulting agreements in the field of nuclear power have been made in Yugoslavia. One concerns research on the applicability of automation in nuclear-power production, and the other deals with clearance work in the nuclear-power field.

"From Yugoslavia's point of view I believe that in the execution of the program the Finnish model would interest them the most. With Atomenergoexport in Loviisa we did successfully carry through the construction program, in which the development of Finland's own industry was taken into consideration. With the program of six power plants the Yugoslavs may be striving to assure the enhancement of their domestic rank and the creation of the conditions for their own industrial development," says Huopalahti.

It is not clear from Tanjug's information what the total cost of the nuclear power program approved by the federal government is estimated to be. The clearance work for Imatran Voima's 1,000-megawatt nuclear power plant made in Finland with Atomenergoexport brought the price of the project in Finland to about seven billion marks.

12327  
CSO: 5100/2545

INTER-AMERICAN AFFAIRS

PERUVIAN ARMY CHIEF ON NUCLEAR WEAPONS TO CHILE

PA221719 Havana International Service in Spanish 1600 GMT 21 Feb 84

[Text] General (Julian Julia), commander in chief of the Peruvian Army, has said that his country will have to take appropriate measures if it is confirmed that the United States has supplied nuclear weapons to Chile. During an inspection tour of garrisons in southern Peru, the Army chief said that the problem was discussed at a meeting in which President Fernando Belaunde Terry and War Minister General Oscar Bruce [as heard] participated. He emphasized that it is up to U.S. and Chilean authorities to either deny or confirm the press reports in question.

The press recently reported that the United States had supplied Chile with nuclear-tipped Pershing missiles.

CSO: 5100/2072

INTER-AMERICAN AFFAIRS

BRIEFS

BRAZILIAN-VENEZUELAN NUCLEAR AGREEMENT--President Joao Figueiredo yesterday forwarded to the national congress the text of the nuclear agreement between Brazil and Venezuela concluded in November of last year. According to the covering memorandum signed by Foreign Minister Saraiva Guerreiro, although owing to the peculiar conditions of its economy Venezuela does not have a short-term program for the generation of nuclear-based electricity, it is carrying out initial research activity in the area. That activity, said the foreign minister, has provided the opportunity for cooperation with Brazil through the exchange of information and technicians, a cooperation which will be broadened and consolidated between the two countries through the agreement. Brazil already has a nuclear cooperation agreement with Argentina, Chile, Colombia, Peru and Mexico. [Text] [Rio de Janeiro GAZETA MERCANTIL in Portuguese 25 Jan 84 p 24] 8711

CSO: 5100/2068

BRAZIL

CONSTRUCTION OF NUCLEAR ARMED SUBMARINES IN 1990's DENIED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 4 Feb 84 p 5

[Excerpt] Santos--The navy minister, Admiral Maximiano da Fonseca, again denied yesterday that Brazil is planning to build submarines equipped with nuclear weapons in the nineties. "We are studying nuclear propulsion; it is not a matter of nuclear weapons," he explained, pointing out that "we are not even capable of building conventional submarines." He declared also that the transfer of technology from the United States to Brazil for arms construction will be very good for the country "if it is free and if our interests are respected."

Maximiano observed that in theory all transfers of technology are very good "because we pay very dearly for foreign technology." In that connection, he cited the contract signed for the construction of two conventional submarines. "One will be built in Germany. The Brazilians will go there to learn the construction. The other will be built here. That is going to turn out to be expensive but it is the only way we have to build submarines, which are complex and sophisticated construction projects.

"If the conventional submarines are built this year, we will be in a position to plan nuclear submarines in the nineties but we do not know which year. There are only 6 years left for the nineties and there are a number of problems to be resolved," added the minister, pointing out also that "building warships is not a problem for Brazil."

8711  
CSO: 5100/2068

EQUIPMENT FROM FRG FOR ANGRA II, III ARRIVES

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 1 Feb 84 p 24

[Text] The first equipment purchased in West Germany for the Angra II and III plants, the storage of which in German warehouses cost Brazil \$1.7 million (about 1.7 billion cruzeiros), began to be unloaded at the NUCLEBRAS Heavy Equipment Corporation (NUCLEP) terminal in Itaguaí (Rio de Janeiro) but it will only be installed a year and a half from now if the timetable for the civil works of the two plants do not undergo further alteration.

The information about the storage of the equipment in Germany was provided by the technical director of the Brazilian Nuclear Corporation (NUCLEBRAS), Ney Freire de Oliveira Junior, although the president of the company, Dario Gomes, had declared that "Brazil did not spend anything" on the storage of the equipment in Germany for 3 years.

The NUCLEBRAS technician in charge of the unloading, Hans Herbert Nolte, explained that the equipment could no longer continue to be stored in Germany, which required payment in hard currency.

According to the technicians, in order to avoid the deterioration of the equipment a plan was devised for maintenance during storage. The pieces of equipment were covered in Germany with sheets of plasticized aluminum containing desiccating elements to maintain the level of humidity in the air at 30 percent because above 50 percent humidity causes damage. He revealed also that the guarantee given by the manufacturer is for 4 years but it was renewed as of the departure from Germany after those maintenance measures had been taken, the costs of which he could not specify.

The NUCLEBRAS president explained that all of the equipment, weighing 7,000 to 8,000 tons, will reach Brazil in eight shipments. He pointed out that shipping costs could reach 15 million marks. According to him, the equipment that is being unloaded in Itaguaí, weighing 3,500 tons, is estimated to be valued at \$150 million, part of the total valued at \$350 million.

The president of NUCLEBRAS explained that another shipment of equipment valued at \$350 million has already been ordered from the German factories to be delivered at the opportune time, raising the foreign purchases for Angra II and III to \$700 million.

BRAZIL

ANGRA-I TO RESUME OPERATIONS; RUMORS OF ACCIDENT DENIED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 4 Feb 84 p 24

[Text] Rio--The Angra-I nuclear plant will be put back into operation next Tuesday after the repair of the turbogenerator shaft, which suffered mechanical erosion due to a design defect which required shutting down the unit since the 17th of last month. This was revealed in Rio yesterday by a spokesman of Furnas, the company responsible for the operation of the plant.

With regard to reports published yesterday to the effect that a serious accident which occurred at Angra-I on 8 October of last year and which could have had the same consequences as the accident of the Three-Mile plant in the United States had been covered up, the spokesman declared that the matter "has been completely superseded."

He said further that it was nothing more than an operational mistake resulting from an incorrect maneuver which cannot be considered technically an accident because there were no material, personal or environmental damages. At the time the mistake occurred, everything was exhaustively explained to the public through the press, declared the Furnas spokesman.

On 5 November 1983, Furnas reported that the incorrect maneuver involved the nonclosing of valves that would prevent the flow of water from the plant's primary system to the storage tank. According to Furnas' account, at that time, the problem was overcome in 2 minutes, stressing that at no time was the reactor nucleus uncovered--the water that cools it did not drop in such a way as to expose it. If that had happened, there could have been a melting of the fuel elements which are maintained at some points at a temperature of up to 2,000 degrees Centigrade.

The National Nuclear Energy Commission (CNEN) did not want to comment on the change by State Deputy Atila Nunes (Brazilian Democratic Movement Party--Rio de Janeiro), reported by the press, describing the 8 October incident at Angra-I as "serious, grave and dangerous." The deputy pointed out that Furnas "covered up the important incident, making it public 3 days after it occurred, declaring that it was only "a simple and initial hydraulic accident."

In the view of the CNEN, "the matter has already been sufficiently and convincingly explained by Furnas" and there is nothing more to be said. According to the CNEN also, the technical and detailed information about what happened at Angra-I has already been presented to the U.S. Nuclear Regulatory Commission (NRC) and the International Atomic Energy Agency (AIEA).

8711  
CSO: 5100/2068

BRAZIL

BRIEFS

ANGRA I SUPPLIES NUCLEAR ENERGY TO RIO--The homes, shops, and industries of Rio de Janeiro are already consuming electric energy from a nuclear source. Executives of the Angra I nuclear plant have reported that yesterday the plant reached 75 percent of its installed capacity and that it returned to its average 50 percent output at the end of the day. According to the chronogram, the plant today must again reach 75 percent of its capacity, estimated at 626 megawatts, at 1500, and 90 percent of its capacity at 2300. At 1900 yesterday, the plant was operating normally and it was hooked up to the electric energy distribution system of the Furnas Electric Company, which supplies all of the southeastern region, with a capacity of 270 megawatts. The Angra I activities were interrupted last week for testing. [Text] [PY242020 Rio de Janeiro JORNAL DO BRASIL in Portuguese 23 Feb 84 p 18]

ANGRA-1 RESUMES OPERATIONS--The Angra-1 nuclear power plant resumed operations on 11 February after a 15-day breakdown due to a defective part in one of the axles of the turbines. Yesterday Angra-1 reached 50 percent of its installed capacity, putting out 313 megawatts for southeastern power-lines. [Excerpt] [Rio de Janeiro O GLOBO in Portuguese 14 Feb 84 p 17 PY]

ANGRA I OPERATES AT FULL LOAD--The Angra nuclear plant last night operated at full load, which means that 26,000 more megawatts are available to the Sao Paulo-Rio de Janeiro region. This was the start of the testing period of a program that covers this area and that will be completed in 10 to 12 days. The plant will not continue operating at full load, but in keeping with testing conditions. After this last stage, Angra I will be cleared by the CNEN, the National Commission for Nuclear Energy. [Text] [PY010200 Brasilia Domestic Service in Portuguese 2200 GMT 29 Feb 84]

CNEN EXPORT QUOTAS--Brasilia--The National Nuclear Energy Commission (CNEN), through a directive published in the federal DIARIO OFICIAL, yesterday released the export quotas for the current 6-month period for: beryllium, lithium, 2,500 tons of niobium concentrate and ore and 250 tons of baddeleyite and cladasite (zirconium) was authorized. The export of amblygonite, a mineral derived from lithium was not permitted. Another CNEN directive published yesterday in the DIARIO OFICIAL sets new prices for services rendered by its Sao Paulo division. The services of the generator of tecnecium 99 MTC have been readjusted by 40 percent; those for the production of sodium iodide 131-I and radioactive sources for gammagraphy (iridium and cobalt), as well as data-processing and the calibration of radiation retainers have been readjusted by 30 percent; and those for dosimetric films by 35 percent. [Text] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 3 Feb 84 p 22.] 8711

CSO: 5100/2068

PERU

NUCLEAR RESEARCH AGREEMENT SIGNED

Lima EL COMERCIO in Spanish 28 Jan 84 p A-8

[Text] With an eye to the application and use of human and material resources for carrying on atomic energy research, an agreement for scientific and technical cooperation has been signed between the Peruvian Nuclear Energy Institute (IPEN) and the National Council of Science and Technology (CONCYTEC).

The agreement is for an unspecified time, which will allow carrying out an effective, very useful task.

The document was signed by Brigadier General (Ret) Juan Barreda Delgado, for IPEN and Roger Guerra Garcia, for CONCYTEC.

Barreda said that with the funds granted to CONCYTEC, financial help in the form of scholarships or fellowships may be awarded to students working for a teacher's degree in basic sciences. The grants will give students the opportunity to carry out research programs abroad in order to receive physics and mathematics training in nuclear phenomena.

The agreement establishes the decision to coordinate efforts so as to spread the knowledge of nuclear science on the national level, while fostering and promoting the carrying out of research projects and support activities by researchers in different fields.

There will also be coordination in the holding of courses and seminars on improvement and updating for science professionals in the nuclear field.

The parties concerned will also name representatives, who will channel communications between the two institutions so as to facilitate the normal development of activities.

In 1983, the council provided subsidies and aid to 97 research projects, which means the permanent support which is offered in the field devoted to research. Peru, for the first time, has asked for Peruvians to be admitted to the UN studies program so that they may carry out their doctoral studies.

12448  
CSO: 5100/2069

PERU

BRIEFS

NUCLEAR RESEARCH CENTER CONSTRUCTION--The Huarangal Project, the first nuclear research center in Peru, which is being built on the right bank of the Chillón River, 40 kilometers from Lima, will be finished in December 1984, reported Juan Barreda Delgado, chairman of the Peruvian Nuclear Energy Institute (IPEN). According to Mr Barreda, the Huarangal Project will begin operating in 1986. The initial investment was estimated at 80 million dollars and currently has been raised to 96 million dollars. This center will support medicine, agriculture and industry. The laboratories will be at the disposal of the scientific community to carry out its own research. [Excerpt] [Lima EL COMERCIO in Spanish 28 Jan 84 p A-7] 12448

CANADIAN SUPPORT FOR NUCLEAR PLAN--The Canadian ambassador to Peru, Michael Bell, has stated that the Canadian Government will cooperate with the nuclear program for peaceful uses being carried out by the Peruvian Institute of Nuclear Energy [IPEN], if Peru so requires. Bell expressed his government's desire for cooperation to the minister of energy and mines, Jose Benavides Muñoz, on the occasion of a protocol visit paid yesterday. The Canadian ambassador noted that his country has successfully applied the "Candu" technology for using natural uranium. He added that this method avoids technological dependence on foreign countries. The energy and mines minister, Benavides Muñoz, for his part, stressed the importance of using nuclear energy for peaceful purposes, and expressed great interest in the Canadian nuclear programs. At present, IPEN is installing a zero power nuclear reactor in Huarangal, Carabayllo, with the cooperation of the Argentine Nuclear Institute. Michael Bell visited the minister's office with Dr George Pon, a Canadian expert on nuclear energy. Also present was Peruvian Army Gen Juan Barreda Delgado, director of IPEN. [Text] [Lima LA PRENSA in Spanish 5 Feb 84 p 6] 2909

CSO: 5100/2070

CONSTRUCTION OF NUCLEAR POWER PLANT DISCUSSED

Cairo AL-AHRAM in Arabic 13 Dec 83 p 3

[Article by 'Adil Ibrahim: "Egypt Is Now Knocking on the Door of the Nuclear Power Era"]

[Text] A few days ago Egypt, for the first time, entered the nuclear power era. The beginning will be the first nuclear plant at al-Dab'ah. This will be the first step in the Egyptian national nuclear program aimed at building eight nuclear plants with a capacity of 8,000 megawatts of electricity by the year 2000 to generate 40 percent of our energy needs, which are estimated at 100 billion kilowatt hours.

Last Saturday, 26 November, witnessed the opening of the bid envelopes of five international companies that are competing to acquire the contract to build the first nuclear power plant which will include two nuclear reactors, each with a 1,000-megawatt capacity. Meanwhile, last Wednesday witnessed the closing session of the second symposium on nuclear safety. Participating were more than 100 Egyptian scholars, including university professors and specialists in fields related to nuclear energy. The purpose was to review all kinds of nuclear safeguards at the first plant against possible leaks of radioactive materials and to evaluate safety studies in order to protect the environment in cooperation with the International Atomic Energy Agency (IAEA).

Although this symposium was the second on nuclear safety this year (the first one was held last April), Egypt actually began nuclear safety studies 6 years ago. In 1977 Egyptian nuclear experts and scholars participated with the IAEA and the French government's Sofratome organization to study the selection of sites in three regions: along the Red Sea coast, along the Delta coast and along the northwest coast. All agreed that al-Dab'ah along the northwest coast was the most appropriate location for the construction of a nuclear power plant.

However, behind all of the scientific, technical and technological studies devoted to the selection of a location for an electricity-generating nuclear power plant in al-Dab'ah is a story of dreams to move from the traditional era of using heat and water for electricity generation to the era of nuclear power. We lived these dreams for a period of 20 years. Then these dreams began to be transformed into reality within a mere 3 years, and today we are beginning to implement these dreams.

Minister of Electricity and Energy Engineer Mahir Abazah says that Egypt began studies for the selection of a location for reactors in 1960 when it began to consider construction of the first Arab nuclear reactor. A committee was formed in 1961 to select an appropriate location for it. The committee studied 19 locations along the Nile, the Delta coast, the northwest coast and the Red Sea. However, it only recommended three sites for the construction of the first Egyptian reactor: Burj al-'Arab, Anshas and al-Fayum. Locations along the Nile or its tributaries were disqualified over concern for the leakage of water exposed to nuclear materials into the Nile waters. In 1962 the Atomic Energy Authority held an international meeting in Vienna in cooperation with the IAEA to study the three sites that were selected. In 1963 the Atomic Energy Authority contracted a British consulting firm to study the selection of these sites and prepare technical specifications for the first Egyptian reactor. In 1964 the authority submitted specifications for the first Egyptian reactor to be built at Burj al-'Arab with a capacity of 150 megawatts. It was to include a fuel factory and a natural uranium reactor for research. However, the project was halted in 1967. Again in 1970 Egypt began to think about building the first Egyptian nuclear power plant. New technical studies began in 1976 to select sites for nuclear power plants to complete the Egyptian national nuclear program. Three locations were reconsidered: the northwest coast west of Alexandria, the North Delta coast from Dumyat to Port Said and the Red Sea coast. The French company Sofratome conducted the studies in coordination with the Nuclear Power Plant Authority, the Remote Sensing Center, the Academy for Scientific Research, the Atmospheric Observation Office and the Earthquake Institute in Halwan. After all of these steps, the decision was made that the region of al-Dab'ah was the best since it met all of the conditions and nuclear safety requirements to protect the public and the environment. It met the construction and operation requirements for nuclear power plants as put forth by the IAEA in Vienna, the American Nuclear Regulatory Commission and French rules and regulations.

Engineer Mahir Abazah adds, "There are concerns about the risks of radioactive materials leaking from the plant into the surrounding environment. Therefore, the planning for any nuclear reactor relies first and foremost on taking strong measures to contain the radioactivity and prevent it from leaking or spreading into the air. Although there has never been an accident at any nuclear power plant, the possibility of such an occurrence exists, even though it is much smaller than the possibility for common, everyday accidents such as airplane explosions, automobile accidents, earthquakes, volcanoes and floods. Although the chance of any emergency is slim, the choice of location and planning for the nuclear power plant are subject to special regulations, even though the occurrence of an accident is next to impossible."

Dr Fawzi Hammad, chairman of the Regulations and Nuclear Safety Commission of the Atomic Energy Authority, states that the fission of the nuclear fuel inside the reactor results in the presence of radioactive materials in solid, liquid or gaseous form. He says that there are three types of radiation: alpha, beta and gamma radiation. Alpha radiation can be shielded with a piece of paper and beta radiation can be shielded with a strip of aluminum. However, gamma radiation can only be stopped with a lead barrier 10 cm thick. We are exposed to these types of radiation throughout our daily lives from watching television

or from natural radiation sources such as water, food, air, dirt and cement. However, there is another type of radioactive material that is produced by the fission of nuclear fuels. These particles are called neutrons, and they can be shielded in a number of ways.

The chairman of the Regulatory and Nuclear Safety Commission states that the technical safety specifications involved in choosing sites and planning nuclear power plants rely on extremely important studies. Whether choosing a site, planning power plants or operating them, it is necessary to protect the workers at the power plant site and the residents in the area surrounding the site. The safety specifications and considerations in the selection of nuclear power plant locations rely on scientific approaches based on geographic and demographic studies and on seismic studies under different atmospheric conditions. Also, safety considerations in designing, operating and maintaining the plant rely on conditions and specifications that will achieve the maximum safety. These include numerous systems and multiple safety barriers and controls for starting the plant and shutting it down in emergency situations without damaging the environment.

Dr 'Ismat Hasani, deputy chairman for projects of the Nuclear Power Plants Authority, says that the nuclear safety specifications require six preventive barriers to stop radioactive materials from leaking out of the reactor. They are as follows:

1. Wrapped metal pipes for the nuclear fuel. These are to contain the by-products of fission.
2. A pressurized container for the reactor that is 7 to 10 inches thick to contain low-level radiation.
3. A biological cement barrier 8 to 10 feet thick that protects those operating the plant and equipment from radiation emanating from the reactor core.
4. An external containment barrier that consists of two shells, an internal one made of iron and an external one made of reinforced concrete. This is 60 meters high and ranges in thickness from 1 to 2 meters. Together these form the external structure of the reactor and prevent radiation from leaking in the event of a rupture to the reactor core.
5. An unpopulated region. This stretches 15 km along the northwest coast at al-Dab'ah and extends 3.5 km into the Sahara. Therefore, the nuclear reactor is located in a circle with a radius of 7.5 km west and east along the coast and 3.5 km north into the water and south into the Sahara. The technical safety specifications for most of the world's nuclear power plants call for the nuclear reactor to be located within an unpopulated circle of no more than 1 km and sometimes much less.
6. An area isolating the power plant from densely populated areas. The plant will be located 20 km west of Alexandria on the northwest coast.

The deputy chairman for projects of the Nuclear Power Plant Authority states that planning for nuclear power plants also guards against all possible accidents in three stages. The occurrence of any technical malfunction is avoided by selecting the best equipment; there is backup equipment that will begin working automatically to avoid any damage that may occur as a result of a technical malfunction; and there are barriers to contain the nuclear reactor, which was designed on the basis of an internal and external worst-case scenario. An example of such an internal accident would be the rupture of the largest cooling pipe and the spilling of its water, and an example of an external accident would be a war plane crashing into the external structure of the reactor.

Concerning radioactive waste, Dr 'Ismat Hasani says that the operations of a 1,000-megawatt nuclear power plant produce no more than 11.6 tons of radioactive waste annually, 10 tons of which contain low-level radiation materials and 1.6 tons of which contain high-level radiation materials. This waste is eliminated depending on the type or amount of radiation it has. Gaseous or liquid waste, which has very little radiation, is kept in special containers for the radiation to disintegrate until it reaches a safe level. High-radiation solid waste, which does not amount to more than 1 ton per year, is submerged in a water-filled container for a specific period of time until it loses its heat and high-level radioactivity. Then it is put in special, radiation-tight, thoroughly locked barrels and taken to be buried under layers of desert granite or thick layers of sand for several years.

Finally, Dr 'Ali Fahmi al-Sa'idi, deputy chairman of the Nuclear Power Plant Authority, stresses that the safety of nuclear power plants have become a certainty and is acknowledged in all parts of the world. For this reason, international nuclear organizations do not object to the construction of large power plants next to residential, industrial, agricultural and tourist areas.

12608  
CSO: 5100/4601

FRANCE SAID WILLING TO FOREGO SAFEGUARDS CLAUSE

Bombay THE TIMES OF INDIA in English 18 Jan 84 p 1

[Text] PARIS, January 17 (UNI)--FRANCE is understood to be willing to forgo the safeguards clause in the supply of nuclear components to India and in the sharing of its fast-breeder technology.

The French government seems to have given its "go ahead" for French companies to participate in tenders floated by India for nuclear components, according to informed sources here.

French firms were reluctant to bid for contracts for components from the department of atomic energy as they were not sure whether the ministry for industry and research in Paris would approve the supply once they clinched the contracts. The ministry, however, does not seem to be stopping the companies from bidding for Indian contracts, the sources say.

The supply of French nuclear components to India and the sharing of its fast-breeder technology were two issues discussed by the French minister for industry and research, Mr. Laurent Fabius, with Indian leaders during his visit to New Delhi a month ago.

His comments on French television after his return implied that France would not make FBR technology sharing and supply of nuclear components to India conditional to India's signing the nuclear non-proliferation treaty (NPT).

France had earlier delayed the supply of enriched uranium for the Tarapur reactor after India and the U.S. had agreed that France could replace the latter as the supplier of fuel apparently because of their insistence on greater safeguards.

This was sorted out after France agree to perpetuity of conditions. The supply of fuel for Tarapur has been going on smoothly since then.

Nevertheless, France still appears to be reluctant to supply the highly-enriched uranium needed to start the operations of India's first experimental fast-breeder reactor at Kalpakkam, which was built with its assistance.

What makes this a sensitive issue is the fact that the fuel needed for the fast-breeder test reactor (FBTR) is "weapon-grade" material and France seems to be insisting on new safeguards clauses, according to the sources. The price of the fuel also is reported to be a matter of dispute.

The issue of fuel for the Kalpakkam FBTR and all aspects of bilateral nuclear co-operation will be discussed intensively during the visit of a high-powered French nuclear delegation to India, planned for early this year. The visit of the delegation was originally scheduled for late last year.

France's decision to allow its companies to bid for tenders for the components needed by India is expected to strengthen nuclear co-operation between the two countries.

CSO: 5100/7051

## SOVIET TEAM TO DISCUSS NUCLEAR POWER PLANT OFFER

New Delhi PATRIOT in English 13 Jan 84 p 5

[Text]

A team of experts from the Soviet Union is expected to visit India shortly to carry on further discussions on its offer to set up two nuclear power plants, with an aggregate capacity of 800 mw, reports UNI.

This is a sequel to the talks Chairman of the Atomic Energy Commission Dr Raja Ramanna had with the Soviet Government during his recent visit to Moscow.

According to informed sources, these discussions encompassing a variety of technical issues are still at a preliminary stage. Even a decision in principle to go ahead with the offer would be taken only after the forthcoming round of talks in India.

The Soviet offer was communicated first to Prime Minister Indira Gandhi during her visit to the USSR in September 1982 and early last year Dr H N Sethna, predecessor to Dr Ramanna, had held discussions in Moscow.

The Soviet side agreed to modify the earlier proposal for a 1000 mw plant into two units of 440 mw each. India had had reservations on having such a gigantic plant from the point of view of technical management and problems of integration with a suitable power grid.

Since then, some other knotty questions have surfaced. Indian technologists have warned the Government against going in for any more nuclear power plants based on imported enriched uranium in view of the sour expe-

rience it has had with the United States on fuel supply for the Tarapur plant.

They had suggested that India should urge the USSR to supply its latest laser beam technology under which uranium found within the country could be enriched.

In fact, the experts had not initially favoured any nuclear power plant based on enriched uranium. They had suggested that the country should opt for thorium-based fast breeder reactors for power generation. Thorium is available in plenty in Kerala and some other parts of India.

Unlike in the Indo-US agreement on Tarapur where the right of inspection regarding proper implementation of safeguards was limited to the concerned plant, the Soviet Union might agree to supply enriched uranium only under the new tightened safeguards of the International Atomic Energy Agency.

These would bring under inspection not only any plant or plants set up with Soviet enriched uranium but also others to which their byproducts were taken in what is known in technical jargon as "throughput safeguards". As a member of the London Nuclear Club, the USSR is a party to these more rigid safeguards and it is wondered whether it could make an exception in the case of India without inviting the wrath of the other members of the 'haves' of the nuclear family.

## JUSTIFICATION FOR NUCLEAR POWER PLANTS QUESTIONED

Calcutta THE STATESMAN in English 30 Jan 84 p 8

[Editorial]

[Text]

PUNJAB is the latest State to demand an atomic power station. Earlier, Karnataka had staked its claim to become the second southern State after Tamil Nadu to house a nuclear station. These demands seem to have been prompted more by considerations of prestige than by clear appreciation of any distinct advantage the projects may afford. Except perhaps for Kalpakkam in Tamil Nadu, which was recently commissioned, the nuclear power plants do not seem yet to have fully justified the enormous expenditure incurred on them. And even Kalpakkam has not always been working at full capacity. Of the others, Tarapur continues to be plagued by diverse problems. Apart from prolonged uncertainty about fuel supplies, there is now a difficulty over spare parts. Besides, there have been occasional reports about radiation hazards which obliged the Government to as-

sure the parliamentary consultative committee for the Atomic Energy Department that the plant was "completely safe". It is good to learn that Indian scientists are now in a position to operate the Tarapur plant with an indigenously developed fuel; if so, this may obviate the need for decommissioning the plant immediately after the supply of enriched uranium from France stops in 1991. The station at Rajasthan, however, can be said to have never been fully commissioned, with its first unit giving trouble for nearly two years and the second scarcely attaining the expected generation level.

But it is not the power plants alone that give cause for concern. The record has been poorer in the production of heavy water needed to sustain the ambitious nuclear power programme envisaging a capacity of 10,000 MW by the beginning of the next century. According to one report, the

three heavy water plants at Nangal, Tuticorin and Baroda could produce only 22.5 tons in 1982-83 against a capacity of 152 tons. Little wonder that a "tremendous shortage" of this material has been officially admitted more than once and proposals were made to import a part of the requirements from the Soviet Union. Work on two other heavy water plants at Manuguru in Andhra Pradesh and Thal in Maharashtra has started, but judging from the pace of construction elsewhere, they are unlikely to be completed on schedule. A committee recently suggested that the heavy water programme be abandoned and that light water reactors, based on enriched uranium, be considered as an alternative. But there are compelling arguments against such a change. What is clear, however, is that the nuclear power targets are unlikely to be reached in the foreseeable future.

CSO: 5100/7057

#### LEFTWING PARTIES PLAN ANTINUCLEAR MEETING

New Delhi PATRIOT in English 7 Jan 84 p 5

[Text] Leaders of eight Left and democratic parties on Friday decided to hold a 'national convention against the danger of a nuclear war and threat to our national security' in the Capital on 8 and 9 March next.

The meeting also decided to associate other parties who agree with the aims of the convention.

Those attending the meeting, at which the decisions taken were, included Mr E M S Namboodiripad, Mr M Basavapunniah and Mr H K Surjeet (CPI-M), Mr Bedabrata Barua and Mrs Ambika Soni (Congress-S), Mr Chandrajit Yadav (Janvadi), Mr K V Raghunath Reddy (DSP), Mr Pratul Chaudhary (RSP), Mr D D Shastri (Forward Block), Mr Brij Mohan (Congress-J), and Mr C Rajeswara Rao, Mr N K Krishnan and Mr M Farooqi (CPI).

Mass organisations of workers, peasants, agricultural workers, youth students women writers and artists would be invited to send representatives to participate in the convention, a CPI press release said.

Prominent non-party individuals and intellectuals who agree with the basic approach of the convention would be approached to participate besides the All-India Peace and Solidarity Organisation (AIPSO).

A convening committee consisting of a representative each of the participating parties was set up to organise the convention.

CSO: 5100/7046

## EXHIBIT ON RADIATION PROTECTION INAUGURATED

Calcutta THE STATESMAN in English 9 Jan 84 p 7

[Text]

BOMBAY, Jan. 7.—The urgent need to promote scientific understanding of the effects of atomic radiation on man and remove the misinformation on the beneficial aspects of atomic energy was stressed by two nuclear scientists, Dr A. K. De and Dr Raja Ramanna, here yesterday.

The occasion was the inauguration of an exhibition on "radiation protection" organized by the Department of Atomic Energy at Nehru Planetarium.

Dr De, chairman of the Atomic Energy Regulatory Board, who inaugurated the exhibition, emphasized the need for the evolution of a strong technology basis and a sound regulatory organization, which he said were essential basic requirements for the effective implementation of quality assurance in a nuclear programme.

Dr Ramanna, chairman, Atomic Energy Commission, in his presidential address, said that fear of destruction of the world by nuclear bomb and misinformation on nuclear energy's beneficial aspects were two negative appor-

ches to the development of nuclear energy which must be combated. This was because there was no alternative in the world today to depending more and more on nuclear energy for power generation and to improve the standard of living, he added.

Dr De pleaded for a balanced view of the developments of peaceful uses of atomic energy and the radiation protection aspects. Formation of the Atomic Energy Regulatory Board could be considered as one of the stages in the evolution of the regulatory control programme in this country.

Dr K. G. Vohar, director, Division of Radiological Protection, BARC, pointed out that ionizing radiations were an inseparable part of living environment. Man was continuously exposed to natural radiation from outer space, soil and rocks. Even the human body contained potassium 40, tritium carbon 14 and radium. Even the air man breathed contained measurable amounts of radon, he added.

CSO: 5100/7047

## ANALYST TELLS INDIAN POSITION ON IAEA MEMBERSHIP

Madras THE HINDU in English 6 Jan 84 p 1

[Article by G. K. Reddy]

[Text]

NEW DELHI, Jan. 5.

The U.S. and other major Western powers like Britain, France and West Germany are trying to work out a new arrangement under which both India and China could continue as members of the Board of Governors of the International Atomic Energy Agency (IAEA) by blurring the distinction between globally and regionally advanced nuclear States.

But the proposal is not acceptable to India since it would still amount to denying India a permanent place on the Board as one of the nine designated members even after the abolition of this distinction.

The Indian position, which has been made quite clear to all the big powers through diplomatic exchanges, is that it has no objection at all to China being offered the status of a designated member so long as it is not downgraded to the level of a non-designated country even after dispensing with the present distinction between globally and regionally advanced nuclear States. If it is not assured of continued representation on the board as a designated member, India would rather quit the IAEA in protest than reconcile itself to election as a non-designated member.

**Accommodating China:** The Board of Governors is due to meet in February to tackle this problem by evolving an agreed procedure for accommodating China on it. But if no acceptable formula is evolved at this meeting, a decision on this issue would be deferred till the next meeting in June when the present term of all the board members, both designated and elected, will expire in the normal course.

If for some reason the big powers are not prepared to accommodate India as a designated member along with China, India will be left with no alternative to giving notice of its decision to quit after the meeting of the board in June when its present term expires in the normal course. Though India has no intention of

denying the IAEA the right to continue to enforce the nuclear safeguards in force, it will be entitled to renegotiate the procedures if not the nature and extent of these obligations, according to legal experts.

The U.S. is particularly sensitive about this aspect since it has been able to persuade Taiwan to let the IAEA enforce the agreed safeguards at the nuclear plants being built on the island with American technical assistance. The Chinese, too, do not want to leave Taiwan with the option to go back on the present arrangement for the enforcement of these safeguards by the IAEA even after it has been thrown out of the organisation, since Beijing would not like to see an un safeguarded nuclear plant operating there.

**India's right:** The Board of Governors consists of 34 members of which nine are designated members with the status of globally advanced nuclear States, three non-designated members which have the status of only regionally advanced States. The remaining 22 are elected on a geographical basis by rotation through an informal understanding among countries of the respective regions.

If India were to agree to being downgraded from a globally advanced to a regionally advanced State, at some stage Pakistan can stake its claim to share the seat with India or get elected in its own right by rotation. As India is the only country outside the five nuclear powers — the U.S., the Soviet Union, Britain, France and China — which has developed a complete fuel cycle, established reprocessing facilities and acquired the technical capability to build and operate fast breeder reactors for the future, it has every right to continue on the board as a globally advanced nuclear State.

It is still hoped that some way will be found to avoid this unpleasant development. The big powers for their own reasons may not want to push India to the point of leaving the IAEA in protest.

CSO: 5100/7045

## WASTE IMMOBILIZATION PLANT FOR TARAPUR

Bombay THE TIMES OF INDIA in English 6 Jan 84 p 6

[Text] BOMBAY, January 5--A nearly Rs. 8-crore waste immobilisation plant will be commissioned at the Tarapur Atomic Power Station in three months.

The plant is to store radioactive waste in a glass matrix from where it would be dissipated into the environment over a period of time. The glass is 30 inches in diameter and 50 inches in height and its durability was tested at the Bhabha Atomic Research Centre in Trombay.

Mr. T. Subbaratnam, senior health physicist of the BARC, who has been associated with the project, said the plant was conceived in 1971 and at the moment trials were in progress. It had been designed by the waste management division of the BARC.

He said that after the plant was commissioned at Tarapur, plans had been drawn up to install a similar unit at the BARC and later at the Madras Atomic Power Project at Kalpakkam.

According to him, the plant would ensure a safer disposal fo radioactive wastes into the environment.

After the Pokharan implosion in 1974, BARC scientists monitored the environment around the area once in six months. For two years they detected minor radioactive deposits, but there was no trace during the last couple of years, he said.

Dr. K. G. Vohra, director, radiological protection, BARC, told newsmen that at the Tarapur plant the workers received an annual radioactive dose of between 1,500 and 2,000 millirems whilst at the BARC it was anything between 100 and 200 millirems. At Tarapur in 1981 it shot up to 2,200 millirems "due to various reasons."

Dr. Vohra was speaking at the preview of the exhibition "Living with atomic radiation' organised by the department of atomic energy at the Nehru Planetarium between 2 p.m. and 8 p.m. till January 25. Entrance is free. The show portrays all aspects of ionising radiations, their sources, methods of detection, standards for the safe use of atomic radiation and its application for the welfare of mankind.

CSO: 5100/7044

ANALYST ON 'NEW TURN' IN TARAPUR CONTROVERSY

Madras THE HINDU in English 14 Jan 84 p 9

[Article by G. K. Reddy]

[Text]

NEW DELHI, Jan. 13.

The Tarapur controversy has taken a new turn with the U.S. insisting on a categorical assurance from India that it will not go in for further test explosions, before considering the request for the supply of spare parts for the nuclear power plant.

After the Secretary of State, Mr. George Shultz, had assured India that those spares that are not available from other sources would be supplied by the U.S., the State Department sought a clarification from India about some unusual activity at the Pokhran site spotted by American spy satellites.

The U.S. maintains that the explanation given by India was ambiguous and not adequate to reassure Washington that India was not contemplating another test in the near future. The stand that is now being taken by the U.S. is that until there is a categorical assurance to this effect, it will be difficult to consider the request for the supply of these badly needed spare parts.

Meanwhile, the hardliners in the U.S. Congress have taken the stand that the so-called sense of the two Houses as summed up by the "committee of conference" clearing the way for authorisation of the supply of these spares by the President is not constitutionally binding on them. In other words, they are reserving the right to raise objections and even overturn the President's decision, if the assurances given by India are not adequate enough in their opinion.

The visiting Congressional delegation has raised this issue in the course of a general discussion with the Prime Minister, Mrs. Indira Gandhi, on Indo-American relations. She merely told them that India did not have the bomb and does not propose to have it, but she cannot agree to any discriminatory constraints on India's nuclear programme until the U.S. and the Soviet Union arrive at some agreement on first reducing and then progressively eliminating their stockpiles.

CSO: 5100/7049

**AEC CHIEF: TARAPUR COULD RUN ON INDIGENOUS FUEL**

New Delhi PATRIOT in English 16 Jan 84 p 1

[Text] If the Government took a decision today, Indian nuclear scientists could start running the Tarapur atomic power plant on indigenously developed mixed oxide (MOX) fuel of uranium and plutonium with absolute safety, Atomic Energy Commission chairman Raja Ramanna said in New Delhi on Sunday report agencies.

Delivering the second part of his lecture on the economic and social consequences of nuclear energy at the India International Centre, he said plant is being run on imported French enriched uranium fuel only because of contractual obligation to the United States from whom India bought the plant.

Dr Ramanna ruled out shutting down the plant when the enriched uranium supplies come to an end in the terminal year in 1991.

He deplored the attitude of nuclear weapon countries which deliberately hamper the growth of nuclear energy in developing countries by imposing unnecessary restrictions on equipment supply and through the facilities inspection clause.

Dr Ramanna said India had no option but to develop nuclear energy in a big way if some affluence were to be brought to the people. Nuclear would be a more important electricity source to the country in the coming years than coal and solar energy.

He said that the Indian nuclear energy programme could reach a breakeven point in the mid-nineties and the Government could net crores of rupees from the investments made.

**Issue Before Reagan**

The United States is understood to have told India that it would be able to consider its request for supply of spare parts to Tarapur plant favourably only if an assurance is given that India would not go in for another Pokhran-type nuclear explosion.

India's recent communication to the US Administration insisting on it fulfilling the obligation under the Indo-US treaty on Tarapur to supply spare parts in now before President Ronald Reagan.

During the recent visit of US Secretary of State George Shultz he suggested that India scout for spare parts in other countries and seek US help only for items not available elsewhere.

CSO: 5100/7050

INDIA

BRIEFS

KALPAKKAM UNIT OPERATIONAL--MADRAS, Jan. 27.—The first 235 MW unit of the Madras atomic power station at Kalpakkam, 60 km from here, was "declared commercial" this morning, reports UNI. It is now producing 200 MW. The Rs 118-crore unit, which was commissioned on July 23 by Mrs Gandhi, took six months to become commercially operational. Although it was expected to begin commercial production by October, it was delayed because of several factors. [Text] [Calcutta THE STATESMAN in English 28 Jan 84 p 1]

CSO: 5100/7056

PAKISTAN

RESOLVE FOR PEACEFUL NUCLEAR PROGRAM RESTATED

GF021228 Karachi DAWN in English 28 Feb 84 p 5

[Editorial: "Pakistan's Nuclear Accord"]

[Text] The visit of the director-general of the International Atomic Energy Agency (IAEA) to Pakistan should help highlight this country's interest in conducting its nuclear programme within the framework of the international rules laid down in respect of the peaceful use of nuclear technology. The paradox of nuclear power is that it can be harnessed for generation of electricity just as it can also be diverted into the making of atomic weapons for military purposes. If the potential which nuclear technology offers as a source of power is not to be wasted--but at the same time the proliferation of nuclear weapons is to be checked--it is logical that international guarantees, safe-guards and inspection procedures be devised to ensure that nuclear capability is not misused. The IAEA has played an important role in this context. It is significant that Pakistan with its growing nuclear programme subscribes fully to the concept of international controls. Opposed as it is to nuclear proliferation, Pakistan upholds the system of international checks and safeguards on nuclear programmes. The Pakistan Government has repeatedly declared that it plans to use its nuclear capacity for peaceful purposes only and atomic energy is not to be channelled into the development of military weapons. As such, it has accepted all the safeguards proposed by the IAEA. It has, in fact, even offered to India point inspection of all nuclear facilities on a reciprocal basis and is prepared to sign the Nuclear-Non-Proliferation Treaty provided; India agrees to do the same.

Pakistan's atomic energy programme has been much maligned in the Western media, and the major nuclear powers have also brought pressure on the government in a bid to get the country to abandon its pursuit of nuclear technology. It is, however, important to view this country's atomic energy programme in its economic perspective. The government has made it clear that nuclear technology is to be used for peaceful purposes only. Its primary objective is to meet the country's growing energy requirement. By the year 2000, Pakistan's energy need is expected to be of the order of 19,500 mW. But the conventional sources of energy in this country are extremely limited. The estimated fossil fuel reserves of 50 million tons of oil, 22 million CFT of natural gas and 500 million tons of coal--all of which have not even been intensively tapped--and the hydel generation of power are expected to yield not more than 9,500 mW. To fill this gap through the import of oil would prove to be a stupendous economic burden and, as such,

outside the reach of the country. In 1981-82 oil imports cost the country 1.7 billion dollars in foreign exchange and this amount will go up even further if oil price rises and the quantum of imports goes up. Moreover, an oil-fired power plant, which would cost less initially than a nuclear power plant, is more expensive to run. Thus, the average power generation cost from the projected 937-mW nuclear power plant at Chasma will be about 50 paisa per kWh as against 150 paisa per kWh from an oil-fired plant of the same capacity. The increase in local participation envisaged in the planned nuclear projects should help step up the pace of industrialisation in the country.

Given the economic justification which exists for installing nuclear plants in the country, the credibility of Pakistan's nuclear programme is not to be doubted. Since the IAEA has formulated basic safety standards for radiation protection and it has adopted specific codes of practice to enforce these standards, it is logical to expect that the nuclear projects of member-countries adhere to the internationally accepted safety criteria. The visit by the director-general of the IAEA and the discussions he will hold with government representatives should clarify the position as it exists. In particular, they should confirm that the safety standards adopted by the various nuclear projects in this country are adequate and the non-military purpose of its nuclear programme is beyond any shadow of doubt.

CSO: 5100/4709

PAKISTAN

NUCLEAR OPTION TERMED 'SOVEREIGN RIGHT'

GF281758 Islamabad THE MUSLIM in English 16 Feb 84 p 4

[Editorial: "The Nuclear Option"]

[Text] The recent interview of Dr A. Q. Khan to an Urdu newspaper seems to have generated a lot of controversy in both the local as well as the international media. Dr A. Q. Khan has himself clarified that his interview was being deliberately misinterpreted. Even the president, before his departure for Moscow, stated in unequivocal terms that "Pakistan does not have any intention of making an atom bomb." In his interview, Dr A. Q. Khan who heads the nuclear research project based at Kahuta, near Rawalpindi, stated that Pakistani scientists had been able to break the Western monopoly in uranium enrichment and had left India years behind in this field. He further added that the decision to seek an atom bomb would be political in nature.

We are at a loss to understand the hullabaloo caused by these remarks of Pakistan's most distinguished nuclear scientist and eminent son of the soil. What has appeared in the Pakistani press on this ground is something which has, with frequent exaggeration, been widely reported overseas. Pakistan's nuclear programme which is only for peaceful purposes, stands out as a proud symbol of our determination to resist external pressures and to build an advanced technical infra-structure for our country's development in the future. This programme, initiated by the previous government, has been sustained with commendable vigour by the present government as well. On this count, Pakistan has suffered a great deal at the hands of the United States and its Western allies, who pursued a policy of manifest duplicity while nuclear projects of India, Israel and South Africa have been allowed to develop without hindrance. The whip has been cracked with intense ferocity at Pakistan quite frequently by a West scared of an imaginary "Islamic bomb." With weapons of mass destruction and also having the dubious distinction of using these to annihilate a sizeable population during the second world war, the United States should be the last country to be telling us whether we should pursue the path of nuclear independence or not. The Americans have neither the legal right nor the moral locus standi to advise Pakistan on this issue or for the state sovereignty and national independence, Dr A. Q. Khan is absolutely right that the decision to make a nuclear bomb would be a political decision. And that would naturally be based on calculations of security and national defence.

While self-congratulations and unnecessary publicity need to be avoided on such a sensitive issue as our nuclear programme, at the same time, the authorities concerned need not be overly defensive on this question. During the end of this month, the director general of the International Atomic Energy Agency [IAEA] will be visiting Pakistan. While we have been accepting IAEA safeguards, our assurances that we are not developing nuclear weapons capability have fallen on deaf ears. The fact of the matter is that on the nuclear issue a national consensus exists in Pakistan, and this consensus underlines Pakistan's right to develop a nuclear programme as it deems fit in accordance with its national interests. Additionally, it also clearly implies that an option of taking the next step from our current ability at successful enrichment of uranium lies within the sovereign right of Pakistan.

CSO: 5100/4709

COMMENTARY ON SCIENTIST'S CLAIMS ABOUT URANIUM ENRICHMENT CAPABILITY

Bombay THE TIMES OF INDIA in English 20 Feb 84 p 8

[Editorial: "Pakistan and the Bomb"]

[Text]

[Text] Despite Islamabad's protestations to the contrary, even its friends abroad have known it for some years that it is engaged in a frantic clandestine effort to build the nuclear bomb. The evidence on this score has been too overwhelming to be dismissed, as Pakistani authorities have tried to do, as "Zionist propaganda." Surely, Mr. Bhutto, who first disclosed in his last testament the elaborate Pakistani plan, fathered by himself, to go in for the "Islamic" bomb, could not be called a Zionist by any stretch of imagination. In any case, by the beginning of this decade it had been firmly established that Pakistan had opted for not one but two routes to the bomb — through uranium enrichment at the Kahuta plant and through plutonium to be obtained by reprocessing the spent fuel of the Kanupp nuclear power reactor. Such scepticism on this score as has since been expressed, including by some individuals in this country, has related largely to the capacity of Pakistani scientists and engineers to make full and quick use of the vast equipment and material obtained by them from the "grey international nuclear market" through trickery and subterfuge, and not to Pakistani ambitions or intentions.

Now the leading Pakistani nuclear scientist, Mr. Abdul Qadir Khan, himself, has dropped what can only be called a bombshell. He has confirmed that Pakistan has developed, in a very short time, the nuclear enrichment capability that West European countries took 20 years to master. What he has said (including his claim that in uranium enrichment Pakistan is far ahead of India) is neither new nor surprising. What is both surprising and significant, however, is that he, of all Pakistanis, should have spoken up on his country's nuclear capability. For, it was Mr. Khan who stole from the Almelo enrichment plant in Holland the designs on which the Kahuta plant near Islamabad is based; he has been convicted and sentenced, in absentia, by a Dutch court on the charge of confidential and secret documents. No wonder, the Pakistanis proudly call him "our Oppenheimer" and have even renamed the Kahuta enrichment plant after him. Understandably, Mr. Khan has generally maintained a very low profile and a total silence about his work. Inquisitive journalists and even diplomats trying to seek out this elusive character have in fact been beaten up by goons apparently belonging to the security squad surrounding him.

Evidently, such a man could not have given a revealing interview to *NAWA-E WAQT*, a Lahore newspaper known to be close to the military regime, in a fit of absentmindedness, especially when he went so far as to declare that if given the "green signal" by the government to make the bomb, the Pakistani nuclear scientists would not disappoint it or the country. Nor has the impact of Mr. Khan's interview been dissipated by the subsequent statement by General Ziaul Haq who has once again made a ritual disavowal of any intention on Islamabad's part to go in for nuclear weapons. For one thing, Gen. Zia waited full five days after the publication of Mr. Khan's interview to issue his so-called denial. For another, at no stage did the Pakistan President claim that the remarks attributed to the scientist had not been made. Mr. Khan himself has only said that some of his remarks have been "deliberately misinterpreted." He has not complained of misquotation or "quotation out of context."

It will be a mistake to assume that Dr. Khan has been guilty of misguided enthusiasm or *NAWA-E WAQT* of misunderstanding him. Such things can and do happen in this country, but not in Pakistan under military rule. In all probability the whole exercise has been meticulously planned and well orchestrated. For it is of a piece with the manner in which General Zia has in the past manipulated opinion at home and abroad on such delicate and embarrassing issues as the execution of Mr. Bhutto, repeated postponement of elections and suppression of human rights. The plan might well be to get a decision announced first and then denied in a way that the situation is further confused, and finally confront the world with a fait accompli. In the present case, it can be argued, however, that since the Pakistanis are unlikely to conduct a nuclear test until after all the F-16s and other military supplies have been received from the U.S., it was perhaps unnecessary for Mr. Khan to draw attention to Pakistan's ongoing nuclear programme. But, as some observers have pointed out, he might be addressing himself to the Arab and other Muslim countries dismayed by the grim goings-on in Lebanon and telling them that they can look forward with hope to Pakistan's "Islamic" bomb.

CSO: 5100/4708

SOUTH AFRICA

NUCLEAR EXPERIMENTS WITH FRUITS, VEGETABLES REPORTED

Johannesburg THE STAR in English 2 Feb 84 p 2M

[Article by Sheryl Raine]

[Text]

Many types of fruit and vegetables are being successfully exposed to minute doses of radiation to substantially lengthen their shelf life in South African shops, the Nuclear Development Corporation of SA has revealed.

The successful processing of 150 tons of strawberries in 1981 encouraged Nucor to treat other foods destined for the consumer market, it reports in its first annual review.

Large-scale experiments with bananas, pawpaws, mangoes, plums and nectarines have been carried out. One food company in Tzaneen has already put up its own commercial food irradiator to preserve pawpaws, bananas and atjar.

Nucor has effectively controlled several troublesome fungi by applying combinations of treatments to fruit such as spanspek.

A series of tests carried out on avocado pears showed that irradiated avocados had a shelf life five to six days longer than that of untreated fruit.

Irradiated bananas kept refrigerated at 13 deg C had double the normal shelf life.

They could be sold 29 days after being placed in the ripening chamber, compared with 14 days for untreated fruit.

The asparagus industry could also benefit from this peaceful application of nuclear technology. The industry suffers heavy losses every year because of the problem of rapid perishing.

Irradiated asparagus does not go brown — and some types even taste better after a mild dose of radiation.

The success achieved in extending the shelf life of plant products encouraged Nucor to experiment with animal products.

Exceptionally good results were obtained with refrigerated chicken. Low radiation doses extended the shelf life from three to five days to more than 30 days.

The growth of mould on biltong was also reduced by radiation.

In conjunction with the Rand Afrikaans University, Nucor is now investigating the possibility of prolonging the shelf life of the mango.

CSO: 5100/19

FEARS OF CAPE RESIDENTS OVER KOEBERG SAFETY NOTED

Johannesburg SUNDAY TIMES in English 12 Feb 84 p 23

[Article by Sarah Hetherington]

[Text]

IS South Africa's first nuclear power station a bold step into the future — or a potential monster which could spread death on the wind?

"I'd rather live at Koeberg than live with a wife who smokes. It's safer," says Dr P Toens, manager of Nucor's geology department.

During the normal operation of the plant, he said, people living at Koeberg would be exposed to less radiation than people in the centre of Johannesburg.

This week, operators were going through final procedures, and scientists were computing last test results at the plant 35km north of Cape Town.

The first unit is scheduled to be fully operational by mid-July, the Minister of Mineral and Energy Affairs, Mr Danie Steyn, has announced.

Soon Koeberg — estimated to cost around R1.5-billion, though not even Escom is sure how much — will be feeding its first electricity into the Escom national grid.

### Unsure

But in Cape Town, people are looking north, some of them unsure of what may happen to them.

With the terrifying film "The Day After" drawing large crowds in Cape Town, fears of a nuclear threat have been revived. And Koeberg is again under the spotlight.

Many wonder whether the nuclear power station on their doorstep could wreak similar catastrophe.

"It is impossible for the reactor to explode," Dr Ken Bogie, of the licensing department of the Atomic Energy Corporation, said this week.

"The worst that can happen, and

the chances of this are incredibly remote, is that all the radioactive material could be released suddenly."

He said the worst accident at Koeberg could cost 1 000 lives and five to 10 times that number could be injured or have their life expectancy reduced.

But, said Dr Bogey, the risk posed by Koeberg was insignificant and the chances of even a minor incident in the plant's 30 to 40-year lifetime were remote.

In the event of any leakage, Escom carries full and unlimited liability. No negligence by Escom has to be proved, and claims can be lodged up to 30 years after exposure to radiation.

Escom is also required by the Atomic Energy Corporation to report any incident and also to let the public know immediately, via the media, what has happened.

Dr J Metz, occupational health expert from UCT, believes the risk posed by Koeberg is insignificant compared to the risks encountered in everyday life.

### III-chosen

But Mike Kanter, of Koeberg Alert — the anti-nuclear watchdog body — is still concerned.

He said: "The chances of an accident are pretty small.

"What we are concerned about is things like birth defects and cancers. The infant

mortality rate after the Three Mile Island accident jumped significantly. Obviously, it is difficult to say this is directly linked.

"I think it's a chance that isn't worth taking for the people of Cape Town, and, more directly, those living in Atlantis and Maitre.

"If nothing else, the siting of Koeberg is ill-chosen."

I visited Koeberg this week to see the preparations.

The huge concrete reactor buildings squat on the wind-swept dunes. Massive pumps suck the Atlantic into cooling systems and spew the water back.

The fuel is loaded and placed in position in the reactor which is submerged in a huge pool. Control rods, acting as neutron sponges, are ready for action.

The giant is about to stir... Nuclear fission, with its lethal by-products, is about to begin.

Experts maintain the generation of clean, safe and ultimately less costly electricity by splitting the uranium atom marks a milestone in South Africa's progress.

The vast reactor units seem to have a life of their own. The concrete vaults house sparkling pools, colossal pipes and pressure vessels.

### Unreal

The stainless steel is polished to mirror-perfection, and bright orange cranes and hoists stand waiting.

The scene is unreal... all it lacks is 007, some villains and a few sharks to complete the illusion.

The incredible energy generated in the reactors is controlled by operators in the space-age control room, but tells the operators what is wrong with it.

The machine is capable of defending itself against almost anything.

It's built on a huge shock-

absorber platform to protect itself against earthquake.

Should anything go wrong, a pyramid of safety mechanisms move into action.

The reinforced concrete containment buildings are designed to withstand even a Jumbo jet crashing directly into it.

There would be damage, but almost certainly no leakage.

"The operators are the first line of defence," said Brian Speller, head of training at Koeberg.

"They are the brains behind the robot."

The operators have every reason to be careful... their families live in the neat village on site.

Operators are very carefully selected and, while matric with maths and science is the minimum requirement, an extensive battery of psychometric tests are carried out to ensure that people selected are mentally and emotionally stable.

More than 50 weeks of training follows, with exams every step of the way, simulator training and an eventual application for an AEC licence.

### No women

Even after this training, 10 to 15 percent flunk out in the simulator and only about 65 percent of applicants are granted licences, which have to be renewed annually.

The simulator control room is a mass of lights, figure display units, telephones and data print-out facilities.

The two men on duty — no women have yet applied to be trained — will spend the wee hours in the hushed room, watching and waiting for the crisis that will probably never happen in the plant's lifetime.

"There are procedures and even more procedures," said a trainee operator.

TOP CAPE TOWN OFFICIALS CLASH OVER KOEBERG

Johannesburg THE CITIZEN in English 24 Feb 84 p 12

[Text]

CAPE TOWN. — The Cape Town medical officer of health, Dr Reg Coogan, has clashed with the town clerk, Dr S Evans, about whether Escom should be the central emergency controller in the event of a Koeberg Power Station radiation leak.

During a Press conference, Dr Coogan said he felt strongly that the operators of nuclear power stations should not be in charge of the civil defence measures which would have to be taken in the case of a nuclear accident.

He said: "I must make it clear that I am opposed to Escom being responsible for the information to be given out about matters which concern the safety and health of the population. I feel the State Health Department should carry the ultimate control in such a case and Not Koeberg's central emergency controller.

"In all the overseas studies on this, not one of them has recommended that the management of the power station responsible for the radiation leak should be put in charge of the population's safety," he said.

Dr Evans, who called

the conference to launch the information pamphlet outlining emergency measures, disagreed with him at the conference.

He said: "I completely disagree with Dr Coogan on that. I am satisfied with our Koeberg emergency plan as it now stands."

"In case of expenses which may have to be incurred due to a nuclear emergency from Koeberg Power Station, Escom would have to pay the damages — that is the law. There they should be giving the instructions on what to do, as well."

The city of Cape Town had undertaken to co-ordinate directly with Koeberg Power Station's central civil defence controller in case of a nuclear accident at the plant, he said.

Dr Coogan said quick evacuation of the huge population of Cape Town would be impossible — that was why the pamphlet concentrated on how to take shelter.

"What you are trying for when protecting such a large population is to do what you can to afford them some protection against nuclear radiation.

"Cape Town, with its two main highways out of the city, would be in an impossible situation trying to get a million and half of people out."

"That was why the American attitude had been adopted in Cape Town.

"They view sheltering as protection against radiation as 50 percent effective inside the basement of a 10-storey concrete building and 20 percent effective in a bungalow-type building, and more desirable than evacuation in most cases," Dr Coogan said.—Sapa.

### Nuke Emergency Plan Campaign Underway

CAPE TOWN.—The Cape Town City Council's information campaign on its Koeberg emergency plan starts with full-page advertisements in newspapers at the weekend.

Information pamphlets will be mailed with electricity accounts during the first two weeks of March.

The pamphlets tell Cape Town residents what they need to know about the emergency plan which will be put into action in "the very unlikely event of a radioactive release from Koeberg".

Potassium iodate tablets — an antidote to radioactive iodine — are available free of charge to anyone who wants them and are obtainable at City Health Department poly-clinics.

At a Press conference to launch the campaign on Wednesday Dr Reg Coogan, the medical officer of health, said that about 15 percent of the time the wind blew from Koeberg towards Cape Town.

"That would be a bad luck factor which would enter into any accident before it would be of interest to Cape

Town."

When drawing up the emergency plans, the city had to consider what it would do to protect inhabitants from medical injuries — radiation injuries and burns from gas and dust clouds, he said.

Included in the internationally-recognised steps, as outlined in the pamphlet, are:

- If a release of radioactive material occurs everyone will be advised by radio (SABC stations), television or public address systems;
- People are advised to keep calm and listen carefully to the instructions;
- People might be advised to take shelter, which means gathering family and household pets and going indoors. Calmly close all doors and windows, switch off fans and air conditioners and seal air bricks or vents;
- If in a motor vehicle, close its doors and windows, switch off the air conditioning and fresh air vents. Such a closed vehicle is also a shelter and

— Sapa.

CSO: 5100/22

## SOUTH AFRICA

### N-POWER FORECASTS CAUSE OF URANIUM STOCKPILES

Johannesburg RAND DAILY MAIL BUSINESS DAY in English 23 Jan 84 p 7

[Article by Brendan Ryan]

[Text]

THE stockpile of uranium in the hands of consumers is estimated at about four years of world annual production, say JSE stockbrokers E W Balderson.

In a research report on the Afrikander Lease mine, they say the main reason for the oversupply has been the continued tendency to over-estimate forecasts for installed nuclear power.

The dramatic effects of a world recession, both in terms of zero or negative growth in electricity demand, as well as severe financial constraints on the vulnerable nuclear construction industry, were not properly appreciated until recently.

"Since 1979, forecasts of future demand have been continuously downgraded. The capacity of nuclear power stations once forecast for 1990 is now unlikely to be reached before 2000.

Mainly because of inflexible uranium and uranium-enrichment contracts, the production industry had failed to respond fast enough.

"Another factor in over-production was the desire of users in recent years to diversify sources of supply, even if this meant making forward purchases in advance of need."

The uranium price slid from a high of \$44.4 a lb in mid-1978 to a low of \$17 in November 1982.

The spot price of uranium has risen steadily since then to around the current \$24 a lb.

The increase was fuelled ini-

tially by the prospect of the introduction of legislation in the United States regulating the importation of foreign uranium.

This legislation was not enacted but the spot price continued to move up as some surplus stockpiles were liquidated and as the cost of carrying inventories dropped with the lowering of interest rates in the United States.

"Some consumers have reportedly commenced a process of building up inventories in anticipation of a major price rise in the long term," the report says.

Most major consumers have entered into long-term supply contracts for uranium to ensure continuity of supply and these contract prices have not been affected as badly as the spot prices.

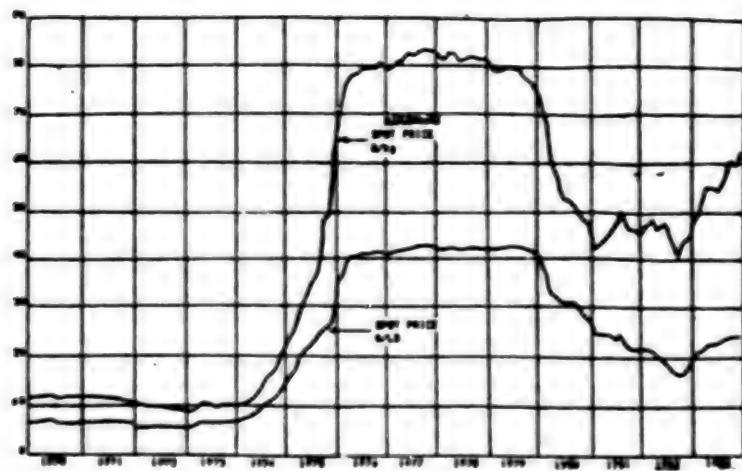
Over the last two years, the decrease in the value of the rand against the US dollar has largely offset the drop in US dollar prices and significantly improved the price in rand terms.

"Uranium experts believe that the spot uranium oxide price will rise slowly to the \$30-\$35 a lb range, where most long-term contracts are priced, towards 1987-1988.

"Then a long slow haul upwards can be expected into the next decade."

The report says the Roxby Downs uranium orebody in Australia contains enough uranium to fuel the entire world at today's rates of consumption for 40 years.

The Australian Government also recently gave the go-ahead



for the development of the world's richest uranium find, the Olympic Dam copper-gold-uranium project in South Australia, which is thought to contain at least 1-million tons of uranium.

For most of the time since 1970, world uranium production outside the communist bloc has exceeded demand by at least 50%, the report says.

"In the USA, about 100 new nuclear power plants are planned. However, no new plants have been ordered since 1976, mainly because of the strong anti-nuclear lobbying in recent years," the report says.

"The arguments in favour of nuclear power seem overwhelming in a world increasingly concerned about pollution — but until the demand for electricity grows substantially, the uranium market looks set to remain in the doldrums."

CSO: 5100/19

De

## UNITED STATES SEEN LINKED TO PAKISTANI ATOM BOMB PLANS

PM091139 Moscow AZIYA I AFRIKA SEGODNYA in Russian No 1, Jan 84 (signed to press 23 Dec 83) pp 20-21

[Article by V. Roshchupkin: "Pakistan: Islamabad's Nuclear Ambitions"]

[Text] In our day the spread of nuclear weapons across the planet is one of the most acute problems facing mankind. It is natural that it should generate profound concern among the world public and all progressive forces protesting against the arms race, including the nuclear arms race, of which the United States is the initiator. The danger of this course can be graphically seen in the example of a country like Pakistan.

For a long time the Pakistani regime has been seeking to satisfy its nuclear appetites. According to press reports, it is close to its goal. How has it succeeded in achieving this? Let's turn to the facts.

...In a desert area of Niger a group of nomads discovered by chance an overturned heavy truck half covered with sand. The truck contained neither freight nor people. It emerged that it was the same truck which had earlier left the uranium mine in Arlit with 20 tons of uranium concentrate. It was to be delivered to Cotonou port (Benin) and then to France, to Marseille. However, the freight "disappeared without trace." The report of the disappearance caused agitation among many foreign press organs. Painstaking reporters soon succeeded in establishing that the traces of the "lost" uranium led...to Pakistan. In particular this was reported by the Paris-published magazine LETTRES D'AFRIQUE.

The French COGEMA company, which controls Niger's uranium mines, hastened to state that there had been no uranium theft. that the truck had simply met with an accident. But confronted with the facts which reached the mass media, the company admitted that in 1979 Pakistan had been sold over 400 tons of uranium raw material. Why did General Ziaul Haq's military regime need this uranium?

Some 40 km from Islamabad is an establishment which officials call "a modest scientific research establishment." The development of scientific research in Pakistan? Well, there's a subject for an article, some Western journalists decided.

But, when they set off for the town of Kohat, where the "researchers" work, they could scarcely imagine the finale to the trip. The reporters were beaten and arrested as soon as they approached the establishment which interested them. But the newsmen had time to notice the artillery pieces and ground-to-air missile launchers surrounding the establishment.

Nonetheless, despite the authorities' desire literally to knock out of the journalists the desire to visit Kohat, the function of the establishment there became known to the press, including the U.S. press. In particular, it was reported that Pakistan had succeeded in acquiring information on modern uranium enrichment methods. The Kohat plant was intended for uranium processing.

For what purpose? By no means to obtain energy which would go to light Pakistani houses, NEWSWEEK magazine writes ironically. Despite the authorities' statements regarding the peaceful nature of the plant in Kohat, its output is intended for military purposes. This heavily guarded enterprise, THE WASHINGTON POST reports, provides a quantity of fissionable material sufficient to produce an atom bomb.

But is this "modest scientific research enterprise" in Kohat the only establishment of this kind? To all appearances, no. THE WASHINGTON POST, citing U.S. intelligence experts, has reported that Pakistani technical specialists are creating an "underground" enterprise for the production of plutonium near Rawalpindi. It is believed abroad that it will enable the military regime to test its first atom bomb 2 years earlier than expected. The secret plant in the Rawalpindi region, the British magazine NEW SCIENTIST reports, is geared to the production of 10-20 kg of enriched plutonium a year. That is enough to produce atom bombs.

And here is what the U.S. journalist David Willis, who has visited the desert region of Pakistan on the shore of the Arabian Sea, has to say. "A group of dirty-gray concrete structures surrounded by a barbed wire fence rises up among the sand dunes. We approached them. There seemed to be not a soul around. But when the cameraman tried to film the establishment for television, they were immediately apprehended by security service agents, who appeared out of nowhere. A Pakistani officer ordered them to leave the region. The reason for the order was clear: The gray buildings contain a nuclear reactor capable of producing plutonium to create atomic weapons..."

It has become known that certain Pakistani circles' secret plan aimed at creating the first "Islamic" atom bomb has received the code name "Project 706." Islamabad first considered acquiring its own nuclear weapons 12 years ago--in 1972. In addition to the above-mentioned establishments, the nuclear fuel processing plant under construction in (Chashme) and the Pakistani nuclear research and technology institute also serve the implementation of this ambitious "project."

The above-mentioned U.S. journalist D. Willis writes that during a tour of a number of Asian and African countries he collected irrefutable evidence that Islamabad, with assistance from certain foreign states, is on the threshold of creating nuclear weapons.

News agency and press reports that the authors of "Project 706" are in a frantic hurry are coming in from many places. One of these reports--from New York--caused a great clamor. At Kennedy Airport the authorities confiscated an unusual cargo from an aircraft bound for Pakistan--over 2 tons of zirconium, a metal used in nuclear technology. It emerged that the zirconium, disguised as ordinary baggage, had been secretly purchased by a former Pakistani serviceman. This story brought to the surface a detail of particular interest to journalists: The retired colonel who was arrested proved to be a personal friend of the Islamabad dictator General Ziaul Haq.

And so there is more than enough evidence in the foreign press that Pakistan has come very close to creating an atom bomb. Even if we concede that some of the journalists' reports have a veneer of the sensationalism characteristic of the Western press, they can still hardly be ignored. After all, the press is merely confirming what officials and institutions have been saying from time to time.

Take, for example, the document "National Intelligence Special Prognosis 31-81," prepared by the American CIA in December 1981. It concluded that Pakistan would be able to explode a nuclear device within the next 3 years. CIA experts maintain that Islamabad will continue to accumulate fissionable materials which can be used to produce nuclear weapons.

A secret telegram sent not so long ago by the U.S. State Department to an American Embassy in the Near East, which fell into the hands of AP journalists, states: "We have weighty grounds for believing that Pakistan is seeking to create a nuclear explosive device."

What is more, similar statements have been made officially on the other side of the ocean, from the lips of representatives of the American Administration themselves. Speaking in the upper house of the U.S. Congress, A. Cranston, Democrat senator from California, admitted: "Pakistan now has potential sources of plutonium, which will later be used in the production of nuclear weapons." Cranston fears that it will be impossible to control this process.

And who, if not R. Spiers, U.S. ambassador to Pakistan, should know the true state of affairs in that country? All the more eloquent is his statement that Islamabad is developing nuclear weapons. In September 1982 the ambassador virtually rejected the assurances of Ziaul Haq's military regime that the nuclear research program being implemented in Pakistan supposedly pursues "purely peaceful ends." In R. Spiers' estimation Pakistan is producing a large quantity of plutonium.

As is known, it is possible to create an atom bomb with the necessary quantity of plutonium or uranium. The [word indistinct] is a matter of technology. Whether a particular power has it is another question. As regards the raw material of uranium, it was not quite clear for some time where Pakistan was getting it from. The affair of the truck found by nomads in the Niger desert enabled light to be shed on that riddle.

But technology? In order to clear up this aspect of the matter too, we should dwell on the figure of one (Abdel Kadyr Khan), whose name is mentioned frequently in the Western press. This engineer was in charge of the construction of the uranium enrichment plant at Kohat. Previously, according to the French magazine LE NOUVEL OBSERVATEUR, Dr (Kadyr Khan) managed to gain access to technology for uranium enrichment by centrifugal separation in the West German-Anglo-Dutch URENCO consortium. And he was originally in charge of purchasing the necessary industrial equipment abroad.

Citing American intelligence sources, the U.S.-published CHRISTIAN SCIENCE MONITOR reported that Pakistani officials in the United States and also in West European countries were making intensive efforts to provide the necessary backup for the explosion of a nuclear device. Materials and equipment in short supply began to flood into Pakistan: pipes made of special steel from the Netherlands and evaporators and compressors from Switzerland. Technology and equipment relating to the production of enriched uranium and nuclear fuel, for which Islamabad's representatives mounted a real hunt, are also coming in from the United States, Canada, the FRG, Britain, France, and China.

LE NOUVEL OBSERVATEUR, which informed its readers how (Kadyr Khan) gathered the necessary technical information, called him "one of the most talented spies of our time." But it is by no means a matter of his merits as a spy. The realization of Islamabad's nuclear pretensions has been made possible because imperialist circles in certain Western countries connive at them.

United States military deliveries to Pakistan are noteworthy in this connection. They even include F-16 fighter-bombers capable of delivering nuclear weapons to their target.

Why, then, did the White House give the green light to massive arms deliveries to Pakistan? For previously Washington had refused Ziaul Haq for a number of years since the Pakistani nuclear program provides for the creation of an atom bomb. But now, by all accounts, this factor has been discounted. Official Washington is in fact shutting its eyes to the Islamabad regime's nuclear pretensions and is intensively arming it. United States military and economic aid to Pakistan will total the huge sum of \$3.2 billion.

What is more, grossly violating the nuclear nonproliferation treaty, which, incidentally, was signed by a U.S. president, Washington is stepping up deliveries to reactionary regimes of the nuclear technology and raw materials necessary to manufacture nuclear weapons. In October 1982 the American magazine THE NATION reported that the Westinghouse Corporation had sold several nuclear reactors to the racist Republic of South Africa. Israel and South Korea have been partners of the United States in nuclear deals for some years now. And Washington now intends, the magazine reports, to deliver a powerful reactor to Pakistan.

Washington's generosity and its connivance at the nuclear ambitions of General Ziaul Haq's reactionary dictatorship are attribute to none other than the U.S. desire to fill the "vacuum" formed in the region as a result of the collapse of the shah's regime in Iran. The gamble on the shah of Iran failed. Now the United States is strongly putting forward Pakistan for the role of the new policeman, and it has already been turned into the chief bridgehead of the "undeclared war" against democratic Afghanistan and into a transshipment base for the American corps of aggression and brigandage--the Rapid Deployment Force.

Massive military deliveries, commentators point out, are giving Pakistan "the possibility of using its once limited means to fulfill a previously forbidden nuclear program." In fact, such programs require very big money. And yet, as Pakistan itself admits, in terms of its development level it occupies 24th place among the world's 34 poorest countries. Every year 120,000 Pakistanis are forced to leave their motherland in search of a piece of bread. Some 113 out of every 1,000 babies die before their first birthday. However, instead of improving the lot of the masses, the authorities channel a significant proportion of funds into military purposes, including the implementation of the notorious "project 706." The work under this plan is also funded by certain rich Arab oil-producing states, including Saudi Arabia. According to the press, Riyadh offered Pakistan \$800 million to complete the work on creating an "Islamic" bomb.

Islamabad's nuclear pretensions arouse profound concern in neighboring states and in everyone who values peace, security, and political stability in Asia. These pretensions are helping to fuel tension in the region and run counter to the interests of Pakistan and its people. On the whole, the militarist course of the present Islamabad regime was one of the reasons which gave rise to the wave of antigovernment demonstrations which recently swamped the country.

COPYRIGHT: "Aziya i Afrika segodnya," 1984 Glavnaya redaktsiya vostochnoy literatury izdatel'stva "Nauka"

CSO: S100/2

**FINLAND**

**LOVIISA NUCLEAR POWER PLANTS OPERATED WELL IN 1983**

Helsinki HELSINGIN SANOMAT in Finnish 10 Jan 84 p 24

[Text] Loviisa (HS)—Last year was the Imatra Power Company nuclear power plant in Loviisa's best so far. The plant produced 6.8 billion kWh of electricity for the national network, which was 15 percent of the country's entire power consumption last year. Both plant units' performance was excellent. As far as Loviisa 1 is concerned, the situation is regarded as a kind of culmination point. In the future, as the plant gets older, it will be hard to achieve similar performance.

Last year Loviisa 1's use coefficient came to 86.4 percent and Loviisa 2's to 90 percent. For the plant's use coefficient to be 100 percent, in the case of Loviisa they would have to operate throughout the whole year at a capacity of 465 Mw, or at full production, and according to the Imatra Power Company the loss is estimated at about 1 percent.

Viewed on an international scale, the amount of radiation the plant's personnel were exposed to last year was also small.

During operation little holes develop in the protective casings of the nuclear power plant fuel, holes from which radioactive gases escape and spread into the water of the reactor area, among other places. At the Loviisa nuclear power plants they have revealed the existence of these so-called fuel leaks. In future they will incur special arrangements in transporting fuel.

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CSO: 5100/2540

NUCLEAR POWER FIRM CITES SUCCESS OF LOVIISA PLANT

Helsinki HELSINGIN SANOMAT in Finnish 9 Feb 84 p 23

/Unsigned article: "IVO Celebrated Loviisa's Anniversary; 'Nuclear Power One-third Cheaper than Coal Power'"/

/Text/ "It cannot be that nuclear power is more expensive than oil," says Doctor of Technology Pekka Pirila, surprised by information according to which nuclear power is turning out to be the most disadvantageous alternative.

Pirila has investigated the economics of different energy forms at the State Technical Research Center. According to him a nuclear power plant is just as expensive as the use of coal power plants and fuel costs. Consequently, a coal power plant is, in terms of capital expenditures, a more expensive alternative than a nuclear power plant, Pirila has calculated.

The share of capital expenditures in the total costs of a coal power plant is about one-third. Oil is an even more expensive alternative than coal, Pirila stresses.

Pirila presented his research results at a party on the seventh anniversary of Loviisa power plant no 1. Imatran Voima had invited Pirila and Professor Jorma Routti of the Institute of Technology to report on nuclear power between birthday cake and champagne.

In his own calculations of expenditures Pirila has taken into consideration the costs which derive from the treatment, storage and placement of nuclear wastes. Their share in the total expenditures is, according to him, approximately one-tenth.

Nuclear power's effects on the environment is not negligible in result of the cost comparison, according to Pirila. "Any way you figure it, the environmental effect is not great." On the other hand, with respect to fossil fuels, i.e. coal and oil, the environmental influence "is not insignificant."

In the United States it has indeed happened that certain nuclear power plants have proven to be unprofitable, Pirila admitted. According to him the reasons are certain unsuccessful projects and the fact that in the United States coal is even cheaper than in Finland.

But the majority of nuclear power plants in the United States do turn a profit, assures Pirila.

#### Consumption Overestimated

When the growth of electricity consumption in Finland was calculated at the start of the 1970's, the calculations turned out to be overestimated. At that time it was reckoned that electricity use would grow annually at a rate of nine percent. It did not happen that way, however. Growth was about one-fifth slower, according to IVO's figures. The result has been an overcapacity.

But it would have been a lot worse if consumption had been underestimated, according to IVO director Anders Palmgren.

Now, according to him, we have learned from our mistakes, and in this decade it is estimated that electricity consumption will grow only 3.5 percent a year, and one percentage point less than that in the 1990's.

According to Palmgren electricity use in the 1970's was also misestimated because we were not able to predict years of abundant rain, importation of electricity from the Soviet Union and the good utilization level of the nuclear power plants. The utilization coefficient of Loviisa No 1 was 86.4 percent last year and that of Loviisa No 2 was 90 percent. Both placed among the world's ten best heavy-water plants. There are about 200 of them altogether.

According to Pirila the influence of the risk of disaster on expenditures is extremely small. According to him even in the worse accident "only a few" would die. The worst accident would be in the same class as the crash of a jumbo airliner, Palmgren judges.

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CSO: 5100/2545

PLAN TO CREATE NUCLEAR WASTE HANDLING INDUSTRY

Madrid ABC in Spanish 10 Feb 84 p 52

[Article by J.M. Fernandez-Rua: "National Radioactive Waste Handling Enterprise to be under Nuclear Energy Board Control"]

[Text] The administration is preparing to create a national enterprise for handling radioactive waste according to a document revising the National Energy Plan to which ABC had access. This means that the handling of this waste will come under said national enterprise, thus separating the responsibility which JEN [Nuclear Energy Board] currently has over this type of operation, with strict control by the Cortes [parliament].

According to the provisions in the new PEN [National Energy Plan], the JEN will in every way be the majority stockholder of that enterprise with 100 percent public capital and with the administrative flexibility necessary to develop a task of the magnitude of the long-term handling of radioactive waste with the openness demanded in this kind of activity. Waste handling financing is to be accomplished through the establishment of a royalty for each kilowatt-hour devoted to this purpose.

The new enterprise will be under parliamentary control and its activities will be watched by an interministerial commission which will be created for this purpose. With the transformation of the JEN into a research and technology center, especially in the energy field, making flexible use of available resources, its activity programs will be oriented along the lines of the directions and priorities in energy research. Specifically, they will serve as an instrumental element for the research policy to be instituted within the PEN, although without being exhaustive since an energy research center connected with this effort will have to be sensitive to the development of its requirements.

Here are the activities planned for the center: Research and development of renewable energy sources, research on the nature of energy contamination directed against the environment, research in areas requiring high technology and on topics dealing with the nuclear field in accordance with directions pertaining to the need for improving the security of the country's nuclear industry.

Radioactive waste handling is one of the problems that is of most concern to the socialist administration within the development of nuclear energy. Right now, power plants more than 10 years old have signed agreements in force with French and British enterprises to ship their waste to those countries for recycling or storage.

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CSO: 5100/2543

ENVIRONMENTALIST CRITICIZES APPROVAL OF PROCESSING FACILITY

Stockholm DAGENS NYHETER in Swedish 27 Jan 84 p 13

[Article: "Decision on Nuclear Waste Poorly Handled"]

[Text] "The decision to store low- and medium-level radioactive waste under the seabed near Forsmark was too great a task for the Swedish administration to handle. The authorities that were involved were unable to handle the matter in a satisfactory way."

"For example, no environmental impact study was made, even though the county government and environmental protection agency are required to do this. After all, the Environmental Protection Act applies to everything that has an impact on the environment."

This was stated by Staffan Westerlund, professor of environmental law at Uppsala University, last Thursday when he presented the so-called white book on the decision to construct the Forsmark storage facility. The white book was published by the Environmental Protection Association of Uppsala County.

Under Seabed

In June of last year the government granted a permit for construction of the facility. The waste is to be stored in a storage facility 50 meters below the seabed near Forsmark.

Staffan Westerlund said that Swedish legislation on environmental protection was too fragmented. Coordination is poor and there are both gaps and overlapping areas. A number of authorities are each responsible for a small section. There is no independent legal procedure to guarantee a balanced review.

Information Lacking

In addition, there is no system for getting information to the people except for the public hearings held by the licensing board for environmental protection. The white book also points out that the international conventions on these matters were disregarded in this case. For example, the United Nations' economic commission has recommended that an environmental impact study be made in cases of this type.

'SECURE' REACTOR MAY BE MARKETED ABROAD SAYS ASEA DIRECTOR

Stockholm SVENSKA DAGBLADET in Swedish 29 Jan 84 p 14

[Article by Anna Bell Dahlberg]

[Text] Orebro--The industry now wants to reopen the Secure debate. Energy Minister Birgitta Dahl was told this at the Hindernsmassan Fair in Orebro.

"Energy: Politics and Reality" was the theme at a meeting held by the Friends of the Mining Industry. This association meets each year during the Hindernsmassan Fair in Orebro. The day was devoted to energy problems and how to replace oil.

In his opening speech, Prof Tor Ragnar Gerholm stated that the government should reconsider Secure--Safe Environment Clean Urban Reactor.

Secure was included in the nationwide referendum on nuclear power held in 1980, in which the Swedish people decided that nuclear power should be phased out by the year 2010.

'Paralyzing'

Most of the panel, which included Asea director Percy Barnevik, OK director Lennart Andersson, chairman of Svenska Shell Alf Bergmann, head of the Federation of Swedish Industries Lars Nabseth, general director of the State Power Board Jonas Norrby, and LO (Federation of Trade Unions) vice-chairman Rune Molin, also strongly advocated a new debate over the Secure reactor.

Percy Barnevik maintained that Secure, Asea's smaller nuclear heating plant, had been dragged into the nuclear power debate and that a decision had been made with no real understanding of the system by the politicians before the referendum took place.

This was denied by both Birgitta Dahl and Rune Molin, who said that a new debate would only paralyze the effect of the new energy policy.

"You should export this technology instead," Birgitta Dahl said. "Build a prototype plant in some other country."

### Threatened To Sell

But Percy Barnevik said that would be impossible as long as Sweden was unwilling to invest in a pilot plant. This opinion was supported by all panel members except Rune Molin and Birgitta Dahl.

"We must respect democratic principles," the energy minister stressed time and time again. She pointed out that the politicians' reality differed from that of the industry.

"We must respect what the entire country has decided and work accordingly," she said.

"Then we will sell our research and development division," Percy Barnevik threatened. The same applied to the division of Asea that is developing hydroelectric power.

### Must Work At Home

"We cannot have technicians and researchers who simply develop technology without having the chance to work with it in Sweden," he said in answer to a direct question from one of the moderators, Sophie Petzell of SVENSKA DAGBLADET.

"We are losing expertise, as well as jobs, and our energy policy must be developed in such a way that jobs and the future opportunity to utilize our expertise are not lost," said Rune Molin.

The general consensus was that the government should introduce a resolution to construct a hydroelectric plant on another major river in order to develop our technology and create jobs, as well as generate more electricity for heating and for industry.

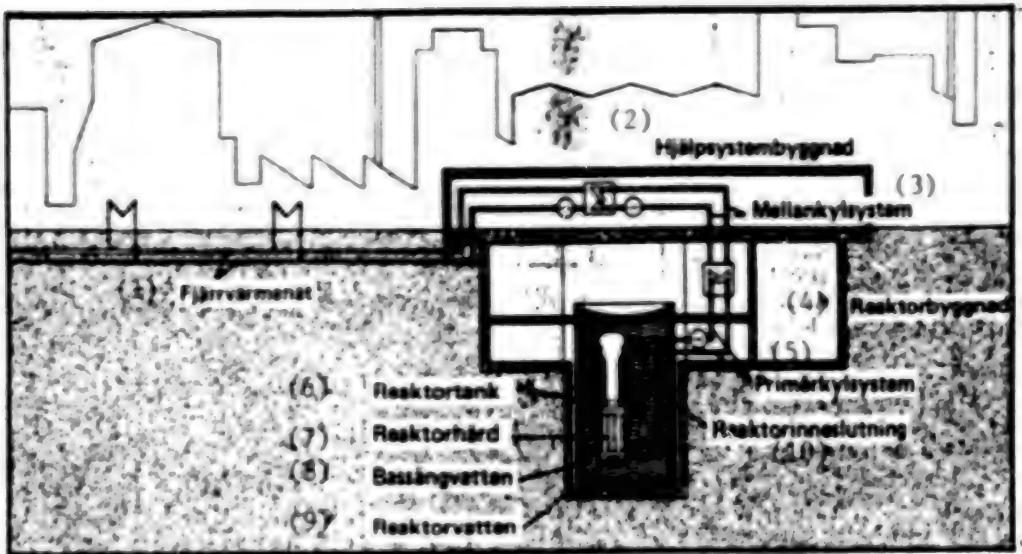
This will not be discussed this spring, in any event, according to Birgitta Dahl.

### Report Criticized

The recent report on hydroelectric power was sharply criticized, but Birgitta Dahl said it would merely serve as a basis for the government's own independent decision.

No one had a clear-cut answer to the question of how Sweden's oil dependency could be reduced. But in the lobby of the Hjalmar Bergman Theater, where the meeting was held, there was an elaborate display on the Secure system and one of the city's newspapers had an editorial on the advantages of Secure that day.

The meeting was jointly arranged by the Friends of the Mining Industry and Svensk Energiforsörjning, which is an information agency owned by the Federation of Swedish Industries, Volvo, SKF (Svenska Kullagerfabriken), among others.



"If we cannot sell our Secure system in Sweden, we will have to sell our research and development division," said Asea director Percy Barnevik at the Hindernsmassan Fair.

#### Key:

1. District heating network
2. Auxiliary systems building
3. Intermediate cooling system
4. Reactor building
5. Primary cooling system
6. Reactor vessel
7. Reactor core
8. Pool water
9. Reactor water
10. Reactor containment

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POWER AUTHORITY DIRECTOR ARGUES CASE FOR NUCLEAR POWER

Stockholm DAGENS NYHETER in Swedish 9 Feb 84 p 12

[Article by Eric Dyring]

[Text] Hydroelectric power is expanded and only one river in Norrland is spared. All oil heating ceases and the combustion of fossil fuels is prohibited for environmental reasons. Oil is used only for transportation and in the chemical industry. Homes are heated by electricity and nuclear heating plants using Swedish uranium.

This is the vision seen by State Power Board general director Jonas Norrby in his private crystal ball, from which he predicted the future of energy in Sweden 75 years from now, in the year 2059. He presented his predictions on Wednesday in Stockholm at the State Power Board's major energy symposium entitled Energy in Change.

The State Power Board is 25 years old. It celebrated with a symposium instead of a traditional reception.

The symposium looked forward rather than backward in time. Strong arguments were presented against phasing out nuclear power by the year 2010.

"On behalf of the government, we are planning to replace nuclear power," said Jonas Norrby. "By the end of the century we will have decided how this country is to obtain its energy. I believe in hydroelectric power, natural gas, peat, wood chips, coal, wind, and solar power, as well as extensive energy conservation."

But Jonas Norrby also believes in the continued use of nuclear power.

"If it is in good shape by the end of the century, I believe it will be difficult to abolish nuclear power, due to economic and environmental considerations."

Dr Curt Nicolin also advocated the continued use of nuclear power. He sharply criticized the inability of the politicians to make rational decisions on energy matters.

"The political ineptitude is shocking. This criticism applies to all

parties. Solutions must be found across political lines."

These comments came at the end of his personal analysis of industrial energy needs by the year 1990. He estimated that at that time Sweden would need 15 to 30 TWh more than currently planned. Total needs will surpass 160 TWh, 60 TWh of which would be required by industry.

Nuclear power, hydroelectric power, coal, and some domestic fuels will be needed to solve this equation. Oil should be used for transportation.

"Everyone knows which energy sources have the least impact on the environment. Why then are we seeing all this agonizing when it comes to decision making?" he asked in his argumentation in favor of nuclear and hydroelectric power.

#### Women

The State Power Board is supporting young people and women technicians in conjunction with its 75th anniversary.

Grants totalling 400,000 kronor are being offered to young researchers at universities and technical schools for energy projects.

The Association of Junior Research Scientists will receive 50,000 kronor from the State Power Board for travel grants to participants in the Young Researchers' exhibit.

The State Power Board wants to have more women technicians and is investing about 1 million kronor to finance a 1-year technological course for 10 to 15 girls.

Girls who have just completed natural science studies in high school are eligible to apply. After completing the course, the participants will be offered jobs on probation at the State Power Board. The course will be held at the high school in Jokkmokk.

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SWEDEN

WASTE-PROCESSING FIRM BEGINS OPERATING NEW FACILITY

Stockholm DAGENS NYHETER in Swedish 3 Jan 84 p 6

[Article by Kjell Lofberg]

[Text] The SAKAB [Swedish Waste Conversion Co] hazardous waste treatment plant has been completed. It stands alone, towering over Narke slatten, like a modern oil refinery. This plant will handle Sweden's hazardous waste, according to a parliamentary resolution.

"Our economic goal is to break even. Our profits will be in the form of a better environment throughout the country," said Hans Wickberg, manager of the SAKAB plant.

Svensk Avfallskonverterings AB is 96-percent owned by the state (Agriculture Ministry). The remaining 4 percent is owned by the Swedish Association of Local Authorities and a foundation of the Federation of Swedish Industries.

When SAKAB decided to construct the plant in such an important agricultural and densely populated area as Narke, there was a storm of protest. People were concerned primarily about possible leaks from the SAKAB facility. An accident at the plant could cause uncontrolled emissions of dioxines, for example, according to critics. That would have catastrophic consequences for people and animals. After all, it was the emission of dioxines that caused the serious accident in Seveso.

Twice As Expensive

As a result of the protests against SAKAB's decision to build in Norrtorp, the final resolution in parliament was delayed. The initial cost estimate was 125 million kronor. In the end, it cost twice that amount. The licensing board required tough new safety measures. Groundbreaking was delayed several years.

"Previously SAKAB had a plant in Lovsta near Stockholm for converting solvents used in the pharmaceutical industry. The idea was that this plant would be built in Norrtorp. But since the decision to permit SAKAB to construct a plant was delayed and a permit for the Lovsta plant was issued, there was a gap of

several years. In the meantime, the pharmaceutical industry built its own conversion plant," Hans Wickberg said.

"Thus, SAKAB now has a permit for its own plant with a capacity of 20,000 cubic meters of solvent from the pharmaceutical industry, which was never built."

#### State-Owned Company

SAKAB established itself in Norrtorp in 1976. Before that time, there had been one environmental scandal after another in this country. Parliament decided that, in the future, all hazardous waste must be treated in a serious and controlled manner by a state-owned company.

Norrtorp near Kumla seemed to be a suitable site. According to the reasoning of SAKAB and the politicians, the area had already been destroyed by decades of shale and limestone mining to the extent that the land was no good for anything else.

"We have been operating in Norrtorp since 1976," Hans Wickberg said. "We can now treat materials we previously exported or stored."

SAKAB's ultramodern conversion plant is now undergoing two types of tests, including pilot operation of the plant. Everything will be tested for 3 months before SAKAB takes responsibility for the plant. If any problems are found, it the contractor's responsibility to deal with them. During pilot operation, an explosion occurred in a furnace when a piece of slag that was too large was being cooled. The explosion caused a shutdown that lasted several weeks.

"It is important and good that these problems occur during test operations and not later," Hans Wickberg said. The explosion was no cause for concern.

In addition to pilot operation, SAKAB will be regulated during a trial period by a permit that will be valid throughout 1984. The licensing board has issued temporary regulations for the plant to see how well SAKAB operates it. After the trial period, permanent regulations will be issued, limiting emissions, combustion, and other activities.

"The SAKAB plant in Norrtorp is the most modern in the world," Hans Wickberg said.

The hazardous waste arrives in drums or containers. The waste is weighed and analyzed at the plant.

"We have a new laboratory to help with the analysis. It is one of the largest in this country. The instruments in this lab cost almost 2 million kronor," Hans Wickberg said.

After the hazardous waste is analyzed, it is sent on for sorting. This occurs on a conveyer. The waste, which is in drums, is then fed automatically into

the 12-meter long rotative furnace where it is mixed with sand. The entire drum is burned in the furnace.

"Special 'recipes' are used in the furnace. We mix different waste products in different ways," Hans Wickberg said.

"The plant also is equipped with a flue-gas purification system that removes heavy metals and other materials. In addition, the groundwater in the area is analyzed regularly. We lowered the groundwater level during construction so that no water could flow from the area without first being analyzed."

#### Slag Product

A slag product of heavy metals remains after combustion. This slag is stored in depots at the bottom of an asphalt basin. When the slag heap is large enough, it is covered first with a thick plastic cover and then with dirt. SAKAB has 75,000 square meters of space for slag storage. This should be enough for 20 years.

"Our disposal technology has attracted much interest abroad. It is considered one of the best available today," Hans Wickberg said.

The hazardous waste that is to be burned by SAKAB in Norrtorp consists primarily of petroleum waste, solvents, paints, and adhesive products. SAKAB estimates that it can burn 9,000 tons of solvent, paint, and adhesive waste annually. It also believes it can handle 30,000 tons of petroleum waste each year. Critics believe that SAKAB is overly optimistic in its calculations.

High oil prices have made it profitable for industry to recycle its waste oil. More and more industries have developed such technology and have begun to recycle their waste. This means less material will be delivered to SAKAB, resulting in losses for the company. But Hans Wickberg believes that SAKAB's estimates are realistic.

#### 'Pessimistic Description'

The debate over SAKAB has concentrated primarily on the combustion of PCB. SAKAB estimates that it will burn 100 tons of PCB annually. According to Wickberg, this is less than 1 percent of all combustion at the plant. He also pointed out that tests involving PCB combustion at the Kommunekemi plant in Copenhagen yielded satisfactory results.

"The debate over the SAKAB plant has been distorted," Wickberg said. "The mass media have always given a pessimistic description of SAKAB, as if it were a disreputable company."

"SAKAB wants to treat all the country's hazardous waste, so that it should be seen as a positive factor in Sweden. In addition, the plant is not a gigantic industry as people seem to think. It actually is no larger than an ordinary coal-fired power plant in any large town in central Sweden."

UNITED KINGDOM

## DETAILS BEHIND RADIOACTIVE SPILL AT SELLAFIELD EXPLAINED

London THE DAILY TELEGRAPH in English 16 Dec 83 p 15

[Article by Kenneth Clarke]

[Text]

**R**AADIOACTIVE seaweed found on a beach near the British Nuclear Fuels plant in Cumbria last month was the result of management misunderstanding, it was admitted yesterday.

Mr Con Allday, chairman of BNFL, told a Press conference at Sellafield, formerly Windscale, that a chemical solvent containing radioactive material was not floated off as it should have been before being discharged into the system.

"This was due to a misunderstanding between managers which led to a failure to comply with operating instructions," said Mr Allday.

He explained that the original discharge took place three or four days before the incident that led to an outcry from environmentalists and attempts by the Greenpeace organisation to block an outlet pipe to the sea.

Radio-active liquid had been transferred from one tank to another, known as Seatank No. 1, which set off radiation alarm monitors.

'Not satisfactory'

"I can only assume the original record was not read. The particular record that the man who authorised the turning of the valves needed to be aware of had been entered in the log three or four days previously," said Mr Allday. "To turn several pages back in a log is clearly not a satisfactory system."

The manager concerned, who was not named, has not been disciplined because he acted "in good faith" when he authorised the valve to be turned.

When the alarm klaxon alerted staff, they tried to siphon the radio-active material off but this was not fully successful, said Mr Allday. Contaminated seaweed was later found on the beach nearby.

Mr Allday admitted that the incident was serious but said there was no evidence that anyone had been hurt or that there was any real hazard to the public.

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